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OCTOBER 1948

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CORRECTIONS

MONTHLY WEATHER REVIEW, September 1948, vol. 76, "Solar Radiation Data for September 1948," p. 218:

For Lincoln, Nebr., on September 26, under Air mass column headed 2.31: the value of .84 should read .79.

For Blue Hill, Mass., the mean for the Air mass column headed *0.97: the value 1.50 should appear as (1.50).

Table 2 should contain the following values in place of those which appeared in the table under the designated station and date:

September 5, Ithaca, N. Y.,	333 cal.
September 14, Grand Lake, Colo.,	530
September 25, Pearl Harbor, T. H.,	562
September 28, East Lansing, Mich.,	284
September 30, Columbia, Mo.,	201

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CHANCE FOR SUCCESSIVE DRY YEARS IN SOUTHERN CALIFORNIA

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[Weather Bureau Airport Station, Los Angeles, Calif.]

Manuscript received May 3, 1948

This investigation of the possibilities for rainfall in the city of Los Angeles and in Southern California was undertaken in response to the ever-present public demand for knowledge of the future and in an attempt to answer some of the more particular questions raised following the dry winter of 1947–48.

From the preliminary survey of rainfall records for the seasons [1] of 1877–78 through 1946–47 for Southern California, it was determined that the Los Angeles record is representative of the characteristics of Southern California rainfall. Comparisons of the magnitude of seasonal rainfall recorded at the Weather Bureau City Office in Los Angeles with county-wide averages for Los Angeles County (Table 1) showed a correlation coefficient of 0.96. Similarly, a correlation coefficient of 0.80 between Los Angeles and San Diego rainfall (Table 2), although lower, served to support this conclusion.

In order to have a basis for comparing successive seasons it was necessary first to make some classification of them based on the monthly distribution and amounts of rainfall. One such classification made by Donnelly [1] defined six types of rainfall seasons. However, since the skewed frequency distribution characteristic of Southern California rainfall shows more years with below-average rainfall in Los Angeles than with above-average amounts (Table 3), other investigators have found that the division of the monthly and seasonal totals into three equal-frequency categories of light, moderate, and heavy is better adapted to their purposes. In the present study the equal-frequency divisions were used (based on figures in Table 4), with a change in terms to dry, normal, and wet, which seem to be better adapted to popular discussion. Strictly speaking, the middle category is no more normal than either of the others since it occurs with equal frequency. It might, in fact, be better to classify the upper quartile as wet years and the lower quartile as dry years, so as to give an equal number of normal and abnormal years, but the spread encompassed by normal years would be rather large.

With the years and months classified on an equal-frequency basis, the next step was the comparison of the number of observed successive months or years of record classed in the same category with the number which could be expected to occur by chance (Tables 5 and 6). A similar technique has been applied to rainfall for the Hawaiian Islands (Table 7) by Solot [2], whose investigations were concurrent with but independent of this study. Solot found that in the Hawaiian Islands both dry years and wet years occurred in succession much more often than could be expected by chance. However, the normal years, or as he labeled them, years with moderate rainfall, occurred with a frequency almost identical to what could be expected by chance. Los Angeles rainfall records, both for the city and county (Table 6), showed fewer successive years in the same category than could be expected by chance.

After the probabilities on the equal-frequency scale had been examined, additional investigation was made of the probabilities of occurrence of seasonal rainfall above or below the arithmetic average for Los Angeles. It was found that 43 percent of the 70 seasons studied had above-average rainfall in Los Angeles and 57 percent had below-average amounts (Table 3). The chance expectancy of an above-average year is, therefore, 0.43, and the probability of N successive years of above-average rainfall is 0.43 to the Nth power. To compare this chance expectancy with observed seasonal rainfall, Table 8 was tabulated, and it was again found that successive years of the same character have not occurred as frequently as could be expected by chance. Similar results showed up in tests of monthly rainfall. Therefore, it can be concluded that probabilities indicate that rainfall amounts for a coming year in Los Angeles will be considerably different than those of the past year. In support of this conclusion, it was calculated that for the 70 years of record under consideration a 60-percent score would have been made by forecasting that a below-average year would be followed by an above-average year, or that an above-average year would be followed by a below-average year.

As a final part of the study, monthly and annual rainfall records of other cities of the United States were examined and results were tabulated (Table 9) on the basis of the equal-frequency categories. These results may be compared with the conclusions drawn from study of the Los Angeles records. The observed succession of years in the same category for some of the cities—Sacramento, Louisville, Denver, and Salt Lake City—proved to be less frequent than could be expected by chance. However, records from other cities—San Diego, Albany, St. Louis, Washington, and New York—showed that some of the observed successions of years of the same category were repeated much more frequently than indicated by chance expectancy. This was particularly true of Albany, N. Y., although there is some evidence that the long record for this station is not necessarily homogeneous.

[1] The rainfall season, or rainfall year, in Southern California is usually accepted as July 1 to June 30. Although this definition was not strictly adhered to in all phases of this study, the period was selected in each case so that it includes a complete winter.

REFERENCES

1. Maurice Donnelly, "Monthly Rainfall Distribution in Southern California with Special Reference to Soil Erosion Problems," *Transactions, American Geophysical Union*, Part I, October 1943, pp. 144–148.

2. S. B. Solot, "Possibility of Long Range Precipitation Forecasting for the Hawaiian Islands," *Research Paper No. 28*, Weather Bureau, Washington, D. C., January 1948.

TABLE 1.—*Contingency table showing correlation of seasonal rainfall in the city of Los Angeles with the county-wide average seasonal rainfall in Los Angeles County (68 seasons, October 1 to September 30)*

		CITY OF LOS ANGELES Dry	Normal	Wet	Total
LOS ANGELES COUNTY	Dry	20	4	0	24
	Normal	2	15	5	22
	Wet	0	4	18	22
	Total	22	23	23	68

TABLE 2.—*Contingency table showing correlation of seasonal rainfall in city of Los Angeles with that in San Diego (70 seasons, July 1 to June 30)*

		LOS ANGELES Dry	Normal	Wet	Total
SAN DIEGO	Dry	14	9	0	23
	Normal	8	9	8	25
	Wet	1	7	14	22
	Total	23	25	22	70

TABLE 3.—*Table showing percentage of occurrence by months of various precipitation classes (70 years, city of Los Angeles)*

Month	Percentage of months With trace or none	Above average	Over 1.00 inch	Over 3.00 inches
July	86	11	0	0
August	69	13	0	0
September	59	19	6	1
October	11	31	19	1
November	17	36	40	11
December	7	39	70	39
January	1	39	71	38
February	7	36	71	39
March	1	37	69	34
April	4	30	30	10
May	21	24	11	1
June	53	16	1	0
Season		43		

TABLE 4.—*Rainfall amounts (inches) by months and season for city of Los Angeles for 70 years of record*

Month	Wettest month	Equal-frequency limits: Lower limit of wet month	Upper limit of dry month	Median value	Arithmetic mean	Driest month
July	0.24	T+	0	T	0.01	0
August	.61	T+	0	T	.03	0
September	5.67	0.03+	0	T	.21	0
October	6.96	.60+	0.13−	0.27	.63	0
November	6.53	1.20+	.20−	.60	1.14	0
December	15.80	3.66+	1.02−	2.35	2.88	0
January	13.30	3.20+	1.15−	2.20	2.96	T
February	13.37	3.40+	1.25−	2.35	3.33	0
March	12.36	3.00+	1.30−	2.25	2.75	T
April	7.53	.84+	.25−	.46	1.03	T
May	3.57	.25+	.03−	.09	.36	0
June	1.39	.02+	T−	T	.07	0
	Wettest season	Lower limit of wet season	Upper limit of dry season	Median	Average season	Driest season
Season	38.18	17.75	12.00−	13.66	15.40	5.59

TABLE 5.—*Expected and observed occurrences of successive months with same rainfall class (70 seasons, November to April) for city of Los Angeles*

Successive months	Probability	Number of opportunities	Expected occurrences	Observed occurrences: Wet	Normal	Dry
1	1/3	420	140	140	139	141
2	1/9	350	39	38	28	38
3	1/27	280	10	7	7	8
4	1/81	210	3	0	2	3
5	1/243	140	1	0	0	0
6	1/729	70	0	0	0	0

TABLE 6.—*Expected and observed occurrences of successive years with same rainfall class*

CITY OF LOS ANGELES (70 seasons)

Successive years	Probability	Number of opportunities	Expected occurrences	Observed occurrences: Wet [1]	Normal	Dry [2]
1	1/3	70	23	23	24	23
2	1/9	69	8	6	5	5
3	1/27	68	3	1	0	2
4	1/81	67	1	0	0	0

LOS ANGELES COUNTY (75 seasons)

1	1/3	75	25	24	26	25
2	1/9	74	8	7	8	8
3	1/27	73	3	2	2	4
4	1/81	72	1	0	0	0

[1] Wet season, over 115 percent of the arithmetic average.
[2] Dry season, less than 79 percent of the arithmetic average.

TABLE 7.—*Chance and observed recurrence intervals of successive months with same rainfall class for Hawaiian Islands (from Solot [2])*

Successive months	Chance interval of recurrence	Observed interval of recurrence: Light	Moderate	Heavy
1	3	3	3	3
2	9	6	9	6
3	27	12	27	18
4	81	24	81	36
5	243	42	243	72
6	729	84		180
7	2,187	156		420
8	6,561	300		
9	19,683	588		

TABLE 8.—*Expected and observed occurrences of successive years with rainfall above and below the arithmetic average (70 years) for city of Los Angeles*

Successive years	Number of opportunities	Probability for above average	Above average: Expected occurrences	Observed occurrences	Probability for below average	Below average: Expected occurrences	Observed occurrences
1	70	0.43	30	30	0.57	40	40
2	69	(.43)[3]	13	9	(.57)[3]	22	19
3	68	(.43)[3]	5	2	(.57)[3]	13	9
4	67	(.43)[4]	2	0	(.57)[4]	7	3
5	66	(.43)[4]	1	0	(.57)[4]	4	1

TABLE 9.—*Expected and observed occurrences of successive years with same rainfall class*

SAN DIEGO, CALIF.

(97 years)

Successive years	Expected occurrences	Observed occurrences		
		Wet	Normal	Dry
1	32	31	34	32
2	11	10	11	11
3	4	5	3	7
4	1	3	2	3
5	0	1	0	1

ALBANY, N. Y.[1]

(121 years)

1	40	40	41	40
2	14	17	15	19
3	5	11	6	13
4	2	6	1	9
5	1	1	0	7
6	0	0	0	6
7	0	0	0	5
8	0	0	0	4
9	0	0	0	3
10	0	0	0	2
11	0	0	0	1

SACRAMENTO, CALIF.

(97 years)

1	32	34	31	32
2	11	9	9	12
3	4	2	3	3
4	1	0	0	1

ST. LOUIS, MO.

(111 years)

1	37	37	37	37
2	12	14	11	13
3	4	6	1	2
4	1	4	0	0
5	0	3	0	0
6	0	2	0	0
7	0	1	0	0

[1] A preponderance of wet years before 1870 and of dry years after 1900 suggests the possibility of a discontinuity in the representativeness of the rain gage location at Albany.

TABLE 9.—*Expected and observed occurrences of successive years with same rainfall class*—Continued

LOUISVILLE, KY.

(73 years)

Successive years	Expected occurrences	Observed occurrences		
		Wet	Normal	Dry
1	24	25	24	24
2	8	6	5	7
3	3	3	1	1
4	1	1	0	0

DENVER, COLO.

(76 years)

1	25	25	26	25
2	8	9	6	5
3	3	3	0	1
4	1	0	0	0

SALT LAKE CITY, UTAH

(73 years)

1	24	24	24	25
2	8	9	7	5
3	3	3	0	1
4	1	1	0	0

WASHINGTON, D. C.

(75 years)

1	25	25	25	25
2	8	11	12	7
3	3	6	3	2
4	1	2	1	1
5	0	1	0	0

NEW YORK CITY

(74 years)

1	25	25	24	25
2	8	11	10	10
3	3	5	7	4
4	1	2	4	1
5	0	1	2	0
6	0	0	1	0

TABLE 9.—Expected and observed occurrences of measurable rain and of rainfall of various given amounts

METEOROLOGICAL AND CLIMATOLOGICAL DATA FOR OCTOBER 1948

AEROLOGICAL OBSERVATIONS

[For description of change in Table 1 and Charts, see REVIEW, January 1946, p. 6]

Relative humidity data, beginning with October 1, 1948, were computed, and expressed in these tables, on the basis of the vapor pressure over water. Upper air values of relative humidity at levels with temperatures less than 0° C. have formerly been computed and expressed on the basis of the vapor pressure over ice. Therefore, relative humidity data for the period after October 1, 1948, should not be combined with earlier data without necessary conversion.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during October 1948*

STATIONS AND MEAN SURFACE PRESSURES

Standard pressure surface (mb.)	Albany, N. Y. (1,008.8 mb.)				Albuquerque, N. Mex. (839.3 mb.)				Atlanta, Ga. (984.4 mb.)				Big Spring, Tex. (929.2 mb.)				Bismarck, N. Dak. (956.1 mb.)				Boise, Idaho (916.5 mb.)				Brownsville, Tex. (1,015.5 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	86	7.6	82	31	1,620	14.5	41	31	300	13.8	75	31	774	17.6	52	31	505	7.2	62	31	868	11.5	53	31	6	22.1	84
1,000	31	158	(*)	----	31	106	(*)	----	31	166	(*)	----	31	138	(*)	----	31	130	(*)	----	31	127	(*)	----	31	140	23.1	77
950	31	588	8.4	63	31	562	(*)	----	31	603	16.3	56	31	583	(*)	----	31	560	(*)	----	31	517	(*)	----	31	590	20.7	75
900	31	1,028	6.1	61	31	1,027	(*)	----	31	1,060	13.5	56	31	1,047	17.6	47	31	1,005	9.0	48	31	1,021	14.6	40	31	1,053	18.2	68
850	31	1,494	3.6	56	31	1,513	(*)	----	31	1,540	10.5	56	31	1,533	14.7	47	31	1,477	6.9	48	31	1,503	13.1	35	31	1,541	15.6	63
800	31	1,965	1.8	53	31	2,025	13.8	38	31	2,043	8.6	43	31	2,043	12.2	47	31	1,973	4.5	49	31	2,009	9.7	37	31	2,054	13.4	53
750	31	2,511	−.7	53	31	2,569	10.0	40	31	2,580	6.5	33	31	2,587	9.2	43	31	2,503	1.9	47	31	2,545	6.2	40	31	2,603	11.1	44
700	31	3,051	−3.6	51	31	3,134	5.9	43	31	3,137	4.2	29	31	3,150	5.5	42	31	3,050	−.9	44	31	3,103	2.3	40	31	3,169	8.1	45
650	31	3,639	−6.4	46	31	3,736	1.2	48	31	3,739	1.0	26	31	3,755	1.5	41	31	3,639	−4.2	38	31	3,700	−1.8	39	31	3,782	4.9	46
600	31	4,256	−9.6	40	31	4,375	−3.4	50	31	4,376	−2.4	----	31	4,392	−2.8	40	31	4,264	−7.9	31	31	4,329	−5.8	38	31	4,426	1.3	45
550	31	4,926	−13.7	40	31	5,055	−8.0	48	31	5,061	−6.4	----	31	5,077	−6.8	32	31	4,939	−12.1	31	31	5,005	−10.1	35	31	5,122	−2.8	42
500	31	5,640	−18.7	38	31	5,790	−12.5	38	31	5,799	−11.2	----	31	5,814	−11.4	----	30	5,657	−16.8	30	31	5,734	−14.9	----	31	5,870	−7.5	37
450	31	6,423	−23.9	----	31	6,593	−17.9	35	31	6,605	−16.8	----	31	6,621	−16.7	----	30	6,445	−22.3	----	31	6,527	−20.5	----	31	6,692	−13.0	36
400	31	7,266	−30.0	----	31	7,456	−24.3	----	31	7,473	−23.0	----	31	7,490	−22.8	----	30	7,295	−28.9	----	31	7,383	−26.9	----	31	7,571	−18.7	36
350	30	8,200	−37.1	----	31	8,414	−31.5	----	31	8,437	−29.9	----	31	8,455	−30.2	----	30	8,237	−35.9	----	30	8,335	−33.6	----	31	8,552	−25.7	----
300	30	9,249	−44.2	----	31	9,486	−39.6	----	31	9,517	−37.6	----	31	9,532	−38.6	----	30	9,290	−44.0	----	30	9,398	−41.7	----	31	9,650	−33.7	----
250	30	10,451	−51.1	----	30	10,713	−47.8	----	31	10,752	−46.1	----	31	10,761	−46.9	----	30	10,490	−52.2	----	30	10,609	−50.4	----	31	10,903	−43.0	----
200	30	11,889	−54.5	----	30	12,159	−55.2	----	31	12,206	−54.5	----	30	12,209	−54.3	----	27	11,908	−56.1	----	30	12,040	−57.1	----	31	12,372	−53.5	----
175	29	12,751	−55.4	----	28	13,004	−58.8	----	31	13,053	−58.4	----	29	13,053	−58.8	----	26	12,752	−56.4	----	29	12,887	−59.4	----	29	13,215	−59.2	----
150	28	13,731	−57.3	----	23	13,979	−62.6	----	29	14,015	−62.1	----	26	14,018	−62.5	----	23	13,729	−57.1	----	26	13,855	−60.5	----	29	14,167	−64.9	----
125	27	14,880	−59.4	----	14	15,086	−65.4	----	27	15,134	−65.8	----	21	15,135	−66.3	----	20	14,871	−57.6	----	18	15,001	−62.2	----	26	15,258	−70.4	----
100	21	16,268	−60.5	----	7	16,444	−68.0	----	13	16,481	−67.0	----	9	16,507	−68.7	----	13	16,292	−57.2	----	12	16,385	−63.6	----	17	16,565	−73.8	----
80	15	17,665	−59.1	----					6	17,839	−65.0	----					5	17,719	−56.6	----	9	17,758	−61.7	----	10	17,879	−71.0	----
60	7	19,465	−59.9	----																	7	19,552	−61.1	----				
50																					7	20,687	−59.5	----				

Standard pressure surface (mb.)	Buffalo, N. Y. (992.8 mb.)				Camaguey, Cuba [1] (..... mb.)				Caribou, Maine (996.1 mb.)				Charleston, S. C. (1,017.4 mb.)				Ciudad Victoria, Mexico (976.4 mb.)				Columbia, Mo. (989.8 mb.)				Dodge City, Kans. (926.7 mb.)			
Surface	31	221	8.5	81	----	----	----	----	31	191	4.9	86	31	13	13.9	88	31	335	22.9	73	31	239	12.2	65	31	792	13.7	44
1,000	31	160	(*)	----	----	----	----	----	31	158	(*)	----	31	159	17.0	71	31	124	(*)	----	31	151	(*)	----	31	139	(*)	----
950	31	591	9.1	66	----	----	----	----	31	581	6.5	65	31	598	15.8	58	31	574	21.5	71	31	587	13.9	47	31	583	(*)	----
900	31	1,031	6.5	62	----	----	----	----	31	1,021	4.2	62	31	1,054	13.2	58	31	1,040	18.1	73	31	1,038	11.3	48	31	1,039	15.8	35
850	31	1,498	4.1	58	----	----	----	----	31	1,484	1.8	59	31	1,534	10.9	47	31	1,528	15.0	77	31	1,513	8.9	44	31	1,521	12.8	36
800	31	1,999	1.4	56	----	----	----	----	31	1,971	1.0	54	31	2,038	9.3	42	31	2,039	12.2	77	31	2,012	6.5	42	31	2,027	10.0	35
750	31	2,516	−.9	48	----	----	----	----	31	2,489	−2.1	47	31	2,576	7.2	36	31	2,582	9.6	74	31	2,546	3.9	41	31	2,565	6.9	36
700	31	3,054	−3.5	46	----	----	----	----	31	3,031	−4.6	43	31	3,136	4.7	33	30	3,150	6.7	71	31	3,098	1.3	41	31	3,124	3.5	33
650	31	3,643	−6.8	44	----	----	----	----	31	3,614	−7.6	43	31	3,736	1.3	33	30	3,760	3.9	59	31	3,693	−2.2	40	31	3,722	−.5	33
600	31	4,259	−10.0	44	----	----	----	----	31	4,230	−10.9	37	31	4,377	−2.1	----	29	4,404	.7	51	31	4,321	−6.0	37	31	4,356	−4.5	32
550	31	4,932	−14.2	42	----	----	----	----	31	4,896	−14.9	34	31	5,060	−6.2	----	28	5,098	−3.6	52	31	4,999	−10.2	35	31	5,034	−9.2	----
500	31	5,614	−18.9	39	----	----	----	----	30	5,607	−20.1	37	31	5,803	−10.6	----	28	5,846	−8.3	51	31	5,726	−15.0	33	31	5,765	−14.5	----
450	31	6,424	−24.4	----	----	----	----	----	30	6,384	−25.6	----	31	6,611	−16.0	----	27	6,667	−13.3	44	31	6,522	−20.6	----	31	6,556	−20.2	----
400	30	7,263	−31.0	----	----	----	----	----	30	7,223	−31.9	----	31	7,483	−22.2	----	26	7,544	−19.1	38	31	7,375	−26.8	----	31	7,416	−26.5	----
350	30	8,198	−37.2	----	----	----	----	----	30	8,153	−38.7	----	31	8,450	−29.2	----	26	8,524	−26.0	----	31	8,324	−34.0	----	31	8,365	−33.8	----
300	30	9,248	−43.6	----	----	----	----	----	29	9,189	−46.1	----	31	9,534	−36.8	----	26	9,622	−34.5	----	31	9,386	−41.9	----	31	9,428	−41.8	----
250	27	10,461	−49.1	----	----	----	----	----	27	10,388	−51.7	----	27	10,767	−45.7	----	26	10,871	−44.5	----	31	10,500	−49.8	----	31	10,539	−50.4	----
200	22	11,904	−51.9	----	----	----	----	----	18	11,862	−57.1	----	26	12,226	−55.2	----	26	12,329	−56.0	----	31	12,036	−55.4	----	27	12,071	−56.0	----
175	12	12,768	−54.8	----	----	----	----	----	13	12,705	−56.4	----	26	13,068	−59.8	----	25	13,171	−62.3	----	30	12,879	−57.0	----	16	12,926	−58.5	----
150													20	14,038	−65.0	----	25	14,108	−68.9	----	28	13,850	−58.5	----	10	13,906	−60.6	----
125													15	15,122	−67.9	----	21	15,190	−74.8	----	20	14,997	−60.3	----				
100													12	16,454	−69.1	----	11	16,484	−76.4	----	9	16,405	−61.8	----				

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during October 1948*—Continued

Standard pressure surface (mb.)	El Paso, Tex. (882.4 mb.)				Ely, Nev. (810.0 mb.)				Fort Worth, Tex. (993.4 mb.)				Glasgow, Mont. (939.8 mb.)				Grand Junction, Colo. (853.8 mb.)				Great Falls, Mont. (887.7 mb.)				Greensboro, N. C. (987.8 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	30	1,195	18.1	45	31	1,908	7.1	45	31	211	18.7	47	31	648	8.4	45	31	1,474	12.5	37	31	1,128	10.8	41	30	273	10.6	81
1,000	30	105	(*)	----	31	122	(*)	----	31	153	(*)	----	31	125	(*)	----	31	117	(*)	----	31	118	(*)	----	30	170	(*)	----
950	30	561	(*)	----	31	565	(*)	----	31	597	19.3	40	31	560	(*)	----	31	565	(*)	----	31	561	(*)	----	30	602	13.7	57
900	30	1,030	(*)	----	31	1,024	(*)	----	31	1,038	16.2	43	31	1,009	11.9	37	31	1,029	(*)	----	31	1,018	(*)	----	30	1,056	11.2	56
850	30	1,516	18.2	39	31	1,504	(*)	----	31	1,542	13.7	46	31	1,485	9.0	37	31	1,511	(*)	----	31	1,490	10.9	35	30	1,531	8.4	54
800	30	2,032	14.5	42	31	2,011	10.3	36	31	2,051	11.3	46	31	1,984	6.0	39	31	2,023	12.7	31	31	1,993	7.7	37	30	2,029	6.3	47
750	30	2,577	10.4	49	31	2,552	8.2	34	31	2,593	8.4	44	31	2,517	2.8	38	31	2,563	8.8	35	31	2,526	3.8	38	30	2,559	3.9	44
700	30	3,144	6.3	49	31	3,113	3.9	37	31	3,154	5.1	40	31	3,064	−.6	36	31	3,132	4.4	40	31	3,077	−.1	37	30	3,115	1.4	36
650	30	3,748	1.7	53	31	3,712	−.4	39	31	3,757	1.2	37	31	3,655	−3.9	32	31	3,729	.0	42	31	3,672	−3.8	34	30	3,713	−1.4	30
600	30	4,387	−2.5	53	31	4,346	−4.3	35	31	4,394	−2.9	35	31	4,279	−7.6	30	31	4,362	−4.7	41	31	4,294	−7.5	34	30	4,342	−5.0	28
550	30	5,075	−6.4	45	31	5,022	−8.9	33	31	5,079	−7.4	----	31	4,953	−12.0	----	31	5,043	−9.2	39	31	4,968	−11.9	35	30	5,024	−9.0	----
500	30	5,812	−10.8	35	31	5,756	−14.2	----	31	5,814	−11.7	----	31	5,674	−16.9	----	29	5,777	−13.8	35	31	5,688	−17.0	34	30	5,753	−13.8	----
450	30	6,623	−16.2	34	31	6,553	−19.6	----	31	6,623	−17.1	----	31	6,465	−22.4	----	29	6,577	−19.6	33	31	6,474	−23.0	----	30	6,555	−19.1	----
400	30	7,490	−22.7	----	31	7,411	−26.3	----	31	7,487	−23.3	----	31	7,312	−28.9	----	29	7,433	−26.2	----	31	7,321	−29.5	----	30	7,412	−25.3	----
350	30	8,455	−29.8	----	31	8,362	−33.1	----	31	8,450	−30.5	----	31	8,254	−35.9	----	29	8,385	−32.1	----	31	8,259	−36.4	----	30	8,367	−32.4	----
300	29	9,530	−38.0	----	31	9,428	−41.0	----	31	9,527	−38.7	----	30	9,309	−44.0	----	29	9,449	−41.5	----	31	9,310	−44.2	----	29	9,435	−39.9	----
250	29	10,762	−46.4	----	30	10,639	−49.6	----	31	10,755	−47.4	----	29	10,503	−52.4	----	29	10,663	−49.7	----	30	10,506	−51.9	----	29	10,659	−47.7	----
200	29	12,215	−54.6	----	30	12,072	−57.1	----	31	12,203	−55.3	----	27	11,929	−57.4	----	27	12,105	−55.9	----	29	11,935	−58.1	----	27	12,103	−54.6	----
175	25	13,067	−58.8	----	29	12,909	−59.0	----	31	13,046	−59.4	----	25	12,759	−57.5	----	27	12,949	−57.9	----	28	12,769	−58.8	----	25	12,964	−58.0	----
150	23	14,039	−63.3	----	27	13,861	−61.9	----	31	14,003	−63.1	----	24	13,737	−58.0	----	25	13,903	−60.4	----	27	13,744	−59.3	----	22	13,913	−61.6	----
125	16	15,155	−67.4	----	21	14,967	−63.6	----	30	15,113	−66.6	----	20	14,877	−59.0	----	13	15,011	−61.9	----	24	14,883	−60.5	----	15	15,014	−63.3	----
100	13	16,469	−70.9	----	15	16,325	−65.4	----	20	16,447	−68.0	----	17	16,286	−59.2	----	10	16,382	−63.6	----	21	16,275	−61.8	----	10	16,374	−63.4	----
80	6	17,794	−68.9	----	8	17,676	−64.2	----	13	17,783	−66.3	----	12	17,677	−58.0	----					18	17,661	−60.2	----				----
60					6	19,450	−62.2	----	7	19,517	−62.9	----									10	19,443	−58.3	----				----
50																					6	20,585	−58.4	----				----

Standard pressure surface (mb.)	Hatteras, N. C. (1,018.0 mb.)				Havana, Cuba [1] (.....mb.)				Honolulu, T. H. (1,014.7 mb.)				International Falls, Minn. (973.3 mb.)				Joliet, Ill. (997.5 mb.)				Lake Charles, La. (1,017.6 mb.)				Lander, Wyo. (830.9 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	3	16.1	81	----	----	----	----	31	3	26.5	64	31	360	5.7	72	31	178	8.5	77	31	5	17.3	77	31	1,696	8.1	47
1,000	31	154	16.0	75	----	----	----	----	31	131	25.1	66	31	136	(*)	----	31	157	(*)	----	31	155	20.6	63	31	128	(*)	----
950	31	592	13.6	67	----	----	----	----	31	587	21.4	71	31	564	8.6	60	31	586	10.4	60	31	601	18.3	52	31	573	(*)	----
900	31	1,043	11.2	62	----	----	----	----	31	1,047	17.9	75	31	1,004	6.3	58	31	1,033	7.8	58	31	1,059	15.3	52	31	1,030	(*)	----
850	31	1,518	9.2	54	----	----	----	----	31	1,535	14.7	75	31	1,471	3.8	55	31	1,502	5.3	52	31	1,541	13.2	44	31	1,506	(*)	----
800	31	2,019	7.5	46	----	----	----	----	31	2,046	12.5	60	31	1,961	2.1	44	31	1,995	3.2	46	31	2,049	11.0	40	31	2,011	10.3	37
750	31	2,552	5.8	42	----	----	----	----	31	2,592	11.6	36	31	2,484	−.3	42	31	2,520	1.1	41	31	2,589	8.4	37	31	2,552	7.3	36
700	31	3,111	3.6	39	----	----	----	----	31	3,160	9.0	29	31	3,028	−3.2	42	31	3,068	−1.5	39	31	3,152	5.1	36	31	3,109	3.4	39
650	31	3,712	.3	38	----	----	----	----	31	3,775	5.8	----	31	3,614	−6.3	42	31	3,658	−4.8	36	31	3,755	1.9	29	31	3,709	−1.2	39
600	31	4,347	−3.4	37	----	----	----	----	31	4,421	2.0	----	31	4,233	−9.8	35	31	4,280	−8.5	38	31	4,395	−1.9	----	31	4,338	−5.5	39
550	31	5,031	−7.7	36	----	----	----	----	31	5,116	−2.2	----	31	4,903	−13.6	33	31	4,952	−12.4	36	31	5,084	−5.9	----	31	5,018	−10.0	35
500	31	5,765	−12.4	35	----	----	----	----	30	5,867	−7.0	----	31	5,617	−18.4	35	31	5,672	−17.1	----	31	5,822	−10.5	----	31	5,743	−15.3	35
450	31	6,570	−17.9	----	----	----	----	----	30	6,687	−12.4	----	30	6,397	−24.2	----	31	6,456	−23.0	----	31	6,636	−15.7	----	30	6,542	−21.4	----
400	31	7,432	−24.0	----	----	----	----	----	30	7,571	−18.6	----	30	7,239	−30.5	----	31	7,306	−29.4	----	31	7,504	−22.0	----	30	7,390	−27.9	----
350	31	8,393	−31.0	----	----	----	----	----	30	8,553	−25.8	----	30	8,174	−37.3	----	31	8,246	−36.4	----	31	8,472	−29.2	----	30	8,334	−35.0	----
300	30	9,466	−38.4	----	----	----	----	----	30	9,650	−34.1	----	30	9,221	−44.9	----	30	9,310	−44.1	----	31	9,556	−37.0	----	30	9,392	−43.0	----
250	30	10,698	−46.0	----	----	----	----	----	29	10,902	−43.7	----	30	10,418	−52.4	----	30	10,511	−51.5	----	31	10,793	−46.2	----	29	10,602	−51.7	----
200	30	12,153	−54.4	----	----	----	----	----	29	12,367	−54.0	----	30	11,845	−56.0	----	29	11,945	−55.5	----	31	12,243	−56.2	----	25	12,039	−58.0	----
175	29	12,992	−58.4	----	----	----	----	----	29	13,212	−59.9	----	28	12,696	−55.7	----	29	12,793	−56.6	----	31	13,080	−61.5	----	18	12,876	−59.5	----
150	28	13,949	−62.0	----	----	----	----	----	27	14,164	−64.9	----	22	13,676	−55.0	----	28	13,764	−58.2	----	31	14,024	−66.5	----	9	13,817	−59.9	----
125	23	15,051	−64.3	----	----	----	----	----	22	15,263	−69.0	----	16	14,820	−55.2	----	21	14,901	−60.0	----	29	15,115	−70.7	----				----
100	14	16,413	−64.9	----	----	----	----	----	18	16,589	−72.0	----	7	16,236	−55.2	----	14	16,286	−61.6	----	25	16,431	−72.5	----				----
80					----	----	----	----	15	17,907	−70.4	----									14	17,754	−70.7	----				----
60					----	----	----	----	13	19,655	−62.9	----									11	19,485	−65.8	----				----
50					----	----	----	----	11	20,784	−60.1	----									8	20,602	−62.8	----				----
40					----	----	----	----	9	22,196	−56.1	----																----
30					----	----	----	----	5	24,024	−51.5	----																----

Standard pressure surface (mb.)	Las Vegas, Nev. (945.8 mb.)				Little Rock, Ark. (1,009.4 mb.)				Mazatlan, Mexico (1,008.0 mb.)				Medford, Oreg. (969.2 mb.)				Merida, Mexico (1,010.2 mb.)				Miami, Fla. (1,015.6 mb.)				Nantucket, Mass. (1,017.2 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	574	21.2	24	31	79	14.0	77	31	14	27.5	75	31	401	12.8	72	31	27	25.6	82	30	4	23.8	83	24	14	10.9	86
1,000	31	85	(*)	----	31	158	17.5	61	31	84	27.0	74	31	135	(*)	----	31	117	25.1	81	30	140	23.5	81	24	156	12.5	78
950	31	538	(*)	----	31	598	17.3	50	31	542	24.0	71	31	572	14.5	58	31	569	22.8	81	30	589	20.6	83	24	587	10.2	70
900	31	1,006	22.3	22	31	1,057	14.3	51	31	1,010	22.0	62	31	1,025	12.6	52	31	1,038	19.9	81	30	1,053	17.6	83	24	1,033	8.0	64
850	31	1,498	18.4	25	31	1,537	11.4	52	31	1,505	19.6	50	31	1,502	9.6	53	31	1,530	17.2	79	30	1,541	15.0	78	24	1,503	5.9	61
800	31	2,013	14.0	29	31	2,041	9.5	43	31	2,023	16.5	46	31	2,003	7.0	48	31	2,046	14.5	73	30	2,053	12.7	66	24	1,997	3.4	52
750	31	2,558	9.2	36	31	2,579	6.7	40	31	2,578	12.8	45	31	2,537	4.5	38	31	2,592	12.0	66	30	2,594	10.3	58	24	2,525	1.1	50
700	31	3,120	4.7	39	31	3,137	3.8	42	31	3,147	9.0	49	31	3,091	1.8	35	31	3,166	9.0	61	30	3,165	7.6	51	24	3,070	−1.5	48
650	31	3,723	1.0	34	31	3,739	.0	41	31	3,762	5.1	50	31	3,687	−1.5	36	31	3,777	5.8	49	30	3,772	4.2	45	24	3,662	−4.7	----
600	31	4,359	−2.8	32	30	4,371	−3.6	36	31	4,406	1.2	42	31	4,318	−5.2	33	31	4,428	2.2	44	28	4,419	.7	49	24	4,284	−7.5	----
550	31	5,045	−7.0	----	29	5,052	−7.8	34	31	5,104	−2.6	40	31	4,996	−9.4	33	29	5,126	−1.7	41	27	5,114	−3.1	45	23	4,958	−11.7	----
500	31	5,780	−12.2	----	29	5,788	−12.4	----	31	5,852	−7.0	----	31	5,725	−14.3	34	29	5,879	−6.2	39	27	5,862	−7.3	45	22	5,679	−16.4	----
450	31	6,584	−18.1	----	29	6,589	−18.0	----	31	6,675	−12.2	----	30	6,530	−19.6	37	29	6,704	−11.2	31	27	6,684	−12.5	39	22	6,471	−21.7	----
400	31	7,446	−25.0	----	29	7,453	−24.4	----	31	7,557	−18.3	----	30	7,390	−26.0	----	29	7,591	−16.9	----	26	7,566	−18.7	42	22	7,320	−27.9	----
350	29	8,400	−32.1	----	28	8,412	−31.7	----	31	8,539	−25.5	----	30	8,344	−33.2	----	29	8,577	−24.2	----	26	8,548	−25.3	----	21	8,263	−34.6	----
300	29	9,470	−40.2	----	28	9,483	−39.6	----	31	9,639	−33.7	----	30	9,409	−41.5	----	29	9,680	−83.1	----	26	9,648	−33.7	----	20	9,325	−41.1	----
250	28	10,689	−48.7	----	28	10,707	−47.8	----	31	10,892	−43.6	----	30	10,620	−50.5	----	28	10,935	−43.6	----	26	10,900	−43.6	----	18	10,543	−47.0	----
200	27	12,128	−55.7	----	28	12,154	−54.8	----	26	12,348	−55.5	----	29	12,052	−57.4	----	28	12,391	−56.4	----	26	12,362	−55.2	----	18	11,999	−53.0	----
175	23	12,974	−58.8	----	28	13,001	−58.1	----	21	13,171	−62.2	----	29	12,889	−60.2	----	28	13,224	−63.5	----	25	13,203	−61.7	----	17	12,847	−55.2	----
150	18	13,930	−61.3	----	23	13,965	−61.3	----	16	14,106	−68.0	----	29	13,845	−62.0	----	27	14,150	−70.6	----	20	14,153	−68.1	----	17	13,825	−57.5	----
125	10	15,037	−64.6	----	17	15,091	−64.3	----	7	15,164	−72.0	----	21	14,968	−62.7	----	22	15,213	−76.6	----	9	15,218	−73.9	----	16	14,978	−60.3	----
100					7	16,449	−65.4	----					12	16,331	−63.7	----	10	16,505	−80.1	----					10	16,377	−61.6	----
80																	5	17,786	−75.6	----					7	17,796	−61.0	----
60																									5	19,598	−58.8	----

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during October 1948*—Continued

Standard pressure surface (mb.)	Nashville, Tenn. (998.6 mb.)				New Orleans, La. (1,017.9 mb.)				North Platte, Nebr. (919.2 mb.)				Oakland, Calif. (1,014.1 mb.)				Oklahoma City, Okla. (972.1 mb.)				Omaha, Nebr. (981.4 mb.)				Phoenix, Ariz. (971.8 mb.)			
Standard pressure surface (mb.)	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	177	13.5	69	31	2	18.6	80	31	849	8.9	56	31	6	15.1	79	31	391	15.5	48	31	308	11.8	62	30	339	22.7	42
1,000	31	165	(*)	----	31	155	20.5	68	31	136	(*)	----	31	124	15.0	75	31	148	(*)	----	31	149	(*)	----	30	86	(*)	----
950	31	602	14.5	51	31	598	18.0	00	31	574	(*)	----	31	565	15.3	60	31	589	17.9	40	31	584	13.6	45	30	543	27.1	27
900	31	1,054	11.6	49	31	1,058	15.3	54	31	1,025	12.7	45	31	1,018	14.9	44	31	1,047	15.3	39	31	1,034	10.7	44	30	1,013	23.5	29
850	31	1,529	8.7	52	31	1,540	13.1	48	31	1,503	10.6	44	31	1,500	12.9	37	31	1,529	12.5	38	31	1,508	8.4	42	30	1,507	19.3	34
800	31	2,029	6.2	45	31	2,048	11.3	35	31	2,005	7.6	45	31	2,006	10.2	33	31	2,035	10.3	37	31	2,007	6.1	40	30	2,024	15.0	38
750	31	2,563	4.0	37	31	2,593	9.0	31	31	2,538	4.3	45	31	2,545	7.2	33	31	2,575	7.7	36	31	2,538	3.4	37	30	2,572	10.6	40
700	31	3,114	1.7	34	30	3,153	6.0	----	31	3,092	1.3	42	31	3,104	3.7	----	31	3,135	4.6	36	31	3,090	.5	38	30	3,137	6.2	40
650	31	3,712	−1.4	33	30	3,762	3.0	----	31	3,686	−2.2	39	31	3,704	.6	----	31	3,735	.5	38	31	3,686	−3.0	39	29	3,743	2.1	32
600	31	4,341	−5.1	32	29	4,402	−.8	--	30	4,318	−6.1	35	31	4,340	−3.4	----	31	4,372	−4.0	38	31	4,311	−6.6	38	29	4,381	−1.9	28
550	30	5,027	−8.8	33	29	5,094	−4.8	----	30	4,993	−10.9	33	31	5,023	−7.6	----	31	5,054	−8.5	----	31	4,990	−11.0	35	29	5,070	−5.9	----
500	30	5,756	−13.5	----	28	5,834	−9.4	----	30	5,718	−16.1	----	31	5,758	−12.9	----	31	5,786	−13.2	----	30	5,709	−15.8	----	29	5,808	−10.8	----
450	30	6,564	−19.2	----	28	6,653	−14.7	----	30	6,508	−21.9	----	31	6,560	−18.8	----	31	6,585	−18.5	----	30	6,501	−21.4	----	29	6,621	−16.7	----
400	30	7,416	−25.6	----	28	7,523	−20.9	----	30	7,358	−28.7	----	31	7,422	−24.6	----	31	7,449	−24.7	----	30	7,354	−27.8	----	29	7,486	−23.2	----
350	30	8,370	−33.0	----	28	8,496	−27.9	----	30	8,299	−36.0	----	31	8,379	−32.2	----	31	8,406	−32.0	----	30	8,299	−35.2	----	29	8,448	−31.0	----
300	28	9,438	−40.3	----	27	9,584	−36.0	----	30	9,353	−43.8	----	31	9,449	−40.1	----	30	9,473	−40.1	----	30	9,356	−43.2	----	29	9,523	−38.8	----
250	25	10,654	−48.5	----	27	10,825	−45.4	----	29	10,552	−51.9	----	31	10,671	−48.3	----	30	10,694	−48.8	----	30	10,560	−52.2	----	29	10,752	−47.1	----
200	22	12,096	−55.6	----	27	12,278	−55.9	----	23	11,963	−57.4	----	30	12,113	−55.9	----	29	12,138	−56.1	----	28	11,983	−56.6	----	28	12,201	−55.2	----
175	21	12,947	−57.8	----	26	13,114	−60.8	----	18	12,804	−59.0	----	30	12,956	−58.9	----	29	12,980	−59.1	----	25	12,820	−57.4	----	27	13,046	−59.0	----
150	21	13,909	−61.2	----	23	14,060	−65.4	----	8	13,741	−60.0	----	28	13,925	−61.3	----	24	13,951	−62.0	----	20	13,793	−58.3	----	25	14,006	−62.2	----
125	19	15,030	−64.5	----	14	15,165	−68.8	----					22	15,052	−63.7	----	21	15,074	−64.4	----	15	14,936	−59.4	----	15	15,105	−65.8	----
100	14	16,383	−64.8	----									15	16,415	−65.2	----	11	16,453	−66.4	----	11	16,326	−59.7	----	9	16,406	−67.0	----
80													9	17,766	−64.7	----	5	17,791	−65.5	----	8	17,719	−58.6	----				

	Pittsburgh, Pa. (974.4 mb.)				Portland, Maine (1,016.6 mb.)				Rapid City, S. Dak. (904.3 mb.)				St. Cloud, Minn. (978.8 mb.)				San Antonio, Tex. (988.9 mb.)				San Juan, P. R. (1,012.0 mb.)				Santa Maria, Calif. (1,006.3 mb.)			
Surface	31	382	9.3	76	29	20	7.3	83	31	980	7.6	51	31	317	7.5	73	31	240	20.1	67	31	15	25.9	83	31	71	13.6	84
1,000	31	166	(*)	----	29	155	9.5	68	31	133	(*)	----	31	138	(*)	----	31	142	(*)	----	31	120	25.7	82	31	124	12.5	83
950	31	598	9.5	60	29	583	8.1	59	31	570	(*)	----	31	570	10.0	58	31	590	20.9	52	31	575	22.9	81	31	563	15.1	68
900	31	1,040	7.8	62	29	1,025	5.6	57	31	1,019	(*)	----	31	1,012	7.8	54	31	1,054	17.7	55	31	1,042	19.8	81	31	1,017	15.9	48
850	30	1,508	5.4	59	29	1,491	3.8	53	31	1,496	10.9	37	31	1,481	5.8	49	31	1,540	14.6	60	31	1,534	16.9	79	31	1,501	14.0	44
800	30	2,001	2.8	59	29	1,982	1.5	49	31	1,999	8.0	39	31	1,975	3.5	49	31	2,050	12.0	60	31	2,050	14.4	72	31	2,009	11.3	37
750	30	2,529	.5	53	29	2,507	−.8	45	31	2,535	5.0	40	31	2,504	.9	46	31	2,593	9.6	51	31	2,596	12.0	62	31	2,551	8.3	33
700	30	3,072	−2.5	53	29	3,048	−3.5	44	31	3,088	1.5	41	31	3,048	−1.4	39	31	3,159	6.4	48	31	3,169	9.1	54	31	3,112	5.2	28
650	30	3,659	−5.8	51	29	3,636	−6.6	41	31	3,686	−2.1	37	31	3,640	−4.5	36	31	3,768	2.6	44	31	3,782	5.7	54	31	3,718	2.0	----
600	30	4,280	−9.1	45	29	4,252	−10.0	35	31	4,313	−6.2	35	31	4,262	−8.1	37	31	4,407	−.6	37	31	4,432	2.1	45	31	4,355	−1.7	----
550	30	4,952	−12.8	41	29	4,920	−14.0	----	31	4,990	−10.5	33	31	4,934	−12.1	33	31	5,101	−5.0	35	31	5,130	−1.7	39	31	5,042	−5.8	----
500	30	5,669	−17.1	42	28	5,636	−18.9	----	31	5,715	−15.4	31	31	5,656	−16.8	----	31	5,839	−9.8	38	31	5,882	−6.1	38	31	5,781	−11.0	----
450	30	6,459	−22.7	----	28	6,418	−24.3	----	31	6,507	−21.4	----	30	6,444	−22.6	----	31	6,654	−18.1	35	31	6,706	−11.2	34	31	6,590	−16.9	----
400	30	7,304	−28.7	----	28	7,261	−30.5	----	31	7,359	−27.8	----	30	7,292	−29.0	----	31	7,526	−21.2	----	31	7,594	−17.1	31	31	7,457	−23.3	----
350	30	8,246	−35.4	----	28	8,197	−37.4	----	31	8,304	−35.4	----	30	8,233	−36.1	----	31	8,497	−28.4	----	31	8,581	−24.1	----	30	8,416	−30.9	----
300	30	9,304	−42.3	----	28	9,243	−44.5	----	31	9,358	−43.4	----	30	9,285	−43.8	----	30	9,581	−36.2	----	31	9,687	−32.7	----	30	9,493	−38.5	----
250	29	10,514	−48.7	----	28	10,446	−50.5	----	31	10,561	−52.0	----	30	10,489	−50.9	----	30	10,824	−44.6	----	31	10,945	−42.6	----	30	10,724	−46.8	----
200	28	11,962	−53.3	----	28	11,885	−55.1	----	31	11,988	−56.5	----	30	11,922	−55.3	----	30	12,286	−53.8	----	31	12,412	−54.6	----	27	12,168	−54.9	----
175	28	12,818	−55.3	----	28	12,735	−56.0	----	31	12,832	−57.5	----	30	12,772	−56.0	----	29	13,129	−58.7	----	31	13,253	−61.1	----	26	13,010	−57.9	----
150	26	13,797	−57.4	----	28	13,710	−57.9	----	26	13,800	−58.4	----	28	13,741	−56.3	----	26	14,082	−63.0	----	31	14,196	−67.7	----	24	13,968	−60.8	----
125	24	14,947	−59.5	----	25	14,848	−59.5	----	12	14,913	−57.7	----	27	14,890	−57.5	----	19	15,170	−66.6	----	31	15,273	−74.4	----	23	15,091	−63.9	----
100	20	16,351	−59.5	----	22	16,245	−59.9	----	6	16,268	−55.8	----	20	16,294	−57.8	----	8	16,534	−70.0	----	15	16,563	−77.3	----	19	16,454	−65.6	----
80	14	17,755	−59.4	----	14	17,644	−59.5	----					17	17,714	−57.6	----									14	17,815	−63.7	----
60	7	19,596	−56.7	----	10	19,439	−58.2	----					7	19,581	−55.8	----												
50					5	20,592	−56.0	----																				

	Sault Ste. Marie, Mich. (991.5 mb.)				Spokane, Wash. (933.2 mb.)				Swan Island, W. I. (1,011.1 mb.)				Tacubaya, Mexico (774.5 mb.)				Tampa, Fla. (1,016.3 mb.)				Tatoosh Island, Wash. (1,012.8 mb.)				Toledo, Ohio (996.5 mb.)			
Surface	31	221	6.1	90	31	721	8.7	64	31	10	26.4	85	29	2,306	15.5	68	31	9	21.0	81	31	31	10.6	87	31	191	7.6	81
1,000	31	149	(*)	----	31	142	(*)	----	31	107	26.4	82	29	68	(*)	----	31	149	21.5	72	31	137	11.0	78	31	161	(*)	----
950	31	576	6.7	75	31	573	(*)	----	31	571	23.0	84	29	529	(*)	----	31	596	19.0	70	31	568	10.2	65	31	587	9.0	60
900	31	1,015	5.0	67	31	1,023	10.4	52	31	1,031	20.3	82	29	1,006	(*)	----	31	1,056	16.0	72	31	1,012	7.8	59	31	1,033	6.2	57
850	31	1,480	2.7	62	31	1,497	8.2	47	31	1,523	17.6	78	29	1,501	(*)	----	31	1,541	13.3	67	31	1,482	5.6	56	31	1,499	3.6	54
800	31	1,968	.7	55	31	1,995	5.8	41	31	2,040	14.8	75	29	2,027	(*)	----	31	2,050	11.5	54	31	1,976	3.7	49	31	1,990	1.7	49
750	31	2,491	−1.7	50	31	2,522	3.0	38	31	2,595	12.1	69	29	2,579	13.9	67	31	2,591	8.9	46	31	2,503	1.3	42	31	2,515	−.3	43
700	31	3,030	−4.1	46	31	3,076	−.3	39	31	3,161	9.0	66	29	3,157	9.6	73	31	3,156	6.3	38	31	3,050	−1.2	40	31	3,058	−2.9	35
650	31	3,615	−7.6	41	31	3,665	−3.8	36	31	3,782	5.5	63	29	3,771	5.0	80	31	3,761	3.1	----	30	3,645	−4.3	37	31	3,648	−6.3	33
600	31	4,229	−11.4	43	31	4,293	−7.4	33	31	4,423	1.8	64	29	4,408	.7	83	31	4,405	−.2	----	30	4,268	−8.0	40	31	4,263	−10.1	34
550	31	4,895	−15.6	43	31	4,967	−11.5	33	31	5,125	−2.0	55	29	5,116	−2.8	71	31	5,095	−4.3	----	30	4,941	−12.4	45	31	4,931	−14.1	33
500	31	5,604	−20.1	40	31	5,670	−16.3	32	31	5,873	−6.2	53	29	5,865	−7.1	60	31	5,841	−8.8	----	30	5,660	−16.8	44	31	5,646	−18.6	----
450	31	6,385	−25.5	----	30	6,475	−22.1	----	31	6,707	−11.2	51	29	6,689	−12.1	51	31	6,657	−14.0	----	29	6,450	−22.0	----	31	6,429	−23.9	----
400	31	7,223	−31.6	----	30	7,328	−28.3	----	31	7,586	−16.6	46	28	7,571	−18.1	46	31	7,534	−20.0	----	29	7,297	−27.6	----	31	7,273	−30.0	----
350	29	8,172	−37.9	----	30	8,271	−35.4	----	31	8,574	−23.8	----	27	8,556	−25.0	----	31	8,510	−27.0	----	28	8,247	−34.0	----	31	8,211	−36.7	----
300	28	9,218	−45.6	----	30	9,326	−43.4	----	30	9,680	−32.2	----	25	9,656	−33.7	----	30	9,604	−34.8	----	28	9,308	−41.6	----	31	9,262	−44.1	----
250	24	10,428	−51.8	----	30	10,531	−51.4	----	30	10,939	−42.4	----	25	10,908	−43.8	----	30	10,851	−44.3	----	28	10,521	−49.9	----	30	10,460	−50.8	----
200	20	11,876	−56.0	----	30	11,961	−56.5	----	29	12,405	−54.7	----	23	12,365	−55.9	----	29	12,311	−55.7	----	27	11,960	−56.8	----	27	11,907	−54.5	----
175	12	12,733	−55.2	----	30	12,803	−58.0	----	29	13,245	−61.7	----	21	13,201	−62.6	----	27	13,154	−61.7	----	25	12,807	−58.1	----	25	12,763	−56.0	----
150	8	13,736	−57.0	----	29	13,773	−59.2	----	29	14,182	−60.0	----	17	14,137	−68.7	----	26	14,092	−67.9	----	24	13,776	−58.5	----	24	13,735	−57.2	----
125					25	14,927	−60.3	----	25	15,253	−76.0	----	16	15,214	−74.6	----	18	15,162	−73.1	----	20	14,900	−58.7	----	20	14,890	−59.2	----
100					19	16,316	−60.0	----	11	16,528	−78.8	----	8	16,496	−79.3	----	10	16,452	−75.0	----	11	16,271	−57.8	----	12	16,265	−60.4	----
80					13	17,690	−57.7	----					5	17,760	−76.6	----					8	17,667	−57.4	----	8	17,684	−58.4	----
60					9	19,474	−56.6	----																				

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during October 1948*—Continued

Standard pressure surface (mb.)	Washington, D. C. (1,016.3 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	25	12.8	73
1,000	31	161	13.2	65
950	31	590	11.3	58
900	31	1,041	8.6	60
850	31	1,512	6.4	57
800	31	2,008	4.0	57
750	31	2,537	1.5	50
700	30	3,085	−1.4	44
650	30	3,676	−4.2	41
600	30	4,300	−7.7	41
550	30	4,972	−11.5	----
500	30	5,696	−16.3	----
450	30	6,484	−21.7	----
400	30	7,337	−27.9	----
350	30	8,282	−34.8	----
300	30	9,340	−42.1	----
250	30	10,555	−48.8	----
200	28	11,999	−54.3	----
175	27	12,855	−56.9	----
150	23	13,799	−59.3	----
125	19	14,913	−61.2	----
100	15	16,304	−63.2	----
80	11	17,683	−62.4	----

[1] Data not yet received.

(*) Temperature and relative humidity data for this level are not available or are available only for certain days. See note entitled "Change in Summarization of Radiosonde Data," p. 6, in the January 1946 issue of the MONTHLY WEATHER REVIEW.

NOTE.—All observations scheduled between 0300 and 0500, G. C. T., except at Ciudad Victoria, Mazatlan, and Merida, where they are taken near 0200 G. C. T. "Number of observations" refers to those of dynamic height only. (In a few cases temperature or humidity data may be missing for one or more standard pressure surfaces of some observations.) Relative humidity data are not published for standard pressure surfaces having a corresponding mean temperature below −20° C.

All relative humidity observations are obtained by electric hygrometer and have been adjusted to compensate for the values occurring below the operating range of the humidity element. For explanation of the adjustment see article entitled "Curve Method for Obtaining Monthly Means of Relative Humidity," p. 241, MONTHLY WEATHER REVIEW, December 1944.

None of the means included in these tables are based on less than 15 observations at the surface or 5 observations at a standard pressure level.

TABLE 2.—*Free-air resultant winds based on pilot balloon observations made near 2200 G. C. T., during October 1948. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Speeds in meters per second*

Altitude (meters) m. s. l.	Abilene, Tex. (534 m.)			Albuquerque, N. Mex. (1,627 m.)			Atlanta, Ga. (290 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (868 m.)			Brownsville, Tex. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (100 m.)			Charleston, S. C. (16 m.)			Cincinnati, Ohio (273 m.)			Denver, Colo. (1,618 m.)			El Paso, Tex. (1,198 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	31	145	1.5	31	226	1.7	31	333	1.0	31	273	2.0	31	276	2.0	30	305	2.8	30	95	3.3	25	260	2.1	28	316	1.5	29	3	1.1	30	288	1.6	31	12	1.5	31	208	1.8
500							31	338	.9										30	89	4.4	25	255	2.8	28	320	1.6	29	343	1.5	30	283	2.3						
1,000	31	170	2.4				30	280	.7				31	285	2.9	30	300	2.8	28	95	3.0	23	242	3.0	27	307	1.7	29	329	2.5	29	274	2.8						
1,500	27	187	1.8				28	287	1.4	31	273	3.6	28	290	4.0	30	308	1.1	26	90	2.1	18	239	3.0	26	303	2.6	28	327	3.8	28	268	3.5				31	213	2.0
2,000	26	231	2.1	31	224	2.6	28	299	2.7	30	268	5.0	26	287	5.4	30	174	1.0	25	90	.9	16	223	2.1	24	302	3.3	28	309	4.8	27	277	5.3	31	27	1.7	31	204	1.9
2,500	24	275	2.7	31	236	2.4	26	311	4.0	30	272	5.5	25	294	7.3	28	194	2.1	23	31	1.2	13	157	1.6	22	304	3.6	28	298	5.6	25	282	6.7	30	40	1.2	31	220	2.2
3,000	24	270	3.0	31	241	3.2	26	304	5.7	29	274	7.3	25	292	8.6	28	216	2.8	20	345	1.3	11	144	2.5	19	328	4.3	27	286	5.9	22	290	7.7	30	320	.9	31	227	3.4
4,000	23	278	5.1	30	260	4.6	25	282	9.2	28	279	8.3	24	280	10.9	25	238	4.4	17	288	3.3	10	191	1.6	18	333	4.0	26	283	9.4	18	289	9.1	30	291	5.6	29	243	5.3
5,000	23	275	8.2	29	266	6.4	23	282	11.3	26	286	10.3	22	297	14.1	24	244	6.1	15	267	5.0				16	347	6.2	25	274	11.7	17	300	10.2	29	286	6.3	26	247	5.8
6,000	18	288	7.5	27	275	7.5	18	290	12.7	22	282	9.3	20	299	11.2	23	250	5.1	12	264	6.7				15	321	6.2	23	278	13.9	16	309	11.0	27	294	7.8	18	265	7.1
8,000	14	277	13.6	25	282	13.1	12	292	16.8	19	287	10.2	10	279	9.5	15	263	10.6	10	265	10.7							21	274	20.6	14	299	14.3	22	284	7.7	15	270	12.5
10,000				21	273	16.2																						11	278	29.4	11	287	16.7	19	287	11.1	12	269	20.2
12,000				20	283	20.2																												17	293	13.5			
14,000				18	283	19.2																												15	281	16.9			

Altitude (meters) m. s. l.	Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,475 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (10 m.)			Joliet, Ill. (178 m.)			Las Vegas, Nev. (575 m.)			Little Rock, Ark. (88 m.)			Medford, Oreg. (416 m.)			Miami, Fla. (12 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (182 m.)			New York N. Y. (15 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	31	239	1.0	31	280	2.3	30	301	1.0	30	272	3.2	29	46	4.0	29	235	1.8	31	129	1.2	30	165	0.7	31	297	1.4	30	64	3.2	31	61	1.5	30	274	1.0	29	331	1.1
500							30	263	1.5				29	42	3.9	29	232	1.9				30	171	.6	31	295	1.2	30	68	5.5	31	66	1.5	30	260	1.2	29	288	1.1
1,000							30	270	1.9	30	265	4.6	28	29	2.3	29	245	3.5	31	121	1.9	29	232	1.4	31	214	.4	30	60	5.2	31	32	1.6	29	260	1.8	27	310	2.7
1,500				31	279	2.3	30	284	3.1	30	258	7.0	26	312	2.3	29	259	4.7	31	133	1.6	28	279	2.1	31	183	1.8	26	63	4.1	28	12	2.4	29	264	3.1	27	288	2.7
2,000	31	233	1.0	31	284	3.0	28	309	5.0	30	260	8.2	24	307	3.1	24	267	6.6	31	174	1.0	28	300	3.7	28	192	3.7	22	50	2.7	27	358	2.2	29	287	3.8	27	298	4.1
2,500	31	230	1.9	31	270	3.1	27	308	6.1	30	267	9.7	23	301	3.7	21	269	7.0	31	209	1.3	28	296	4.5	25	200	4.4	21	51	1.1	23	340	2.4	27	286	4.9	24	304	4.4
3,000	31	225	2.4	29	255	2.7	24	298	7.8	30	272	9.6	22	305	4.5	20	272	7.7	30	194	1.4	27	300	6.3	23	217	4.5	18	318	1.3	20	312	3.8	26	286	7.3	18	335	4.4
4,000	31	219	2.3	28	248	2.5	24	283	10.0	26	275	11.1	20	285	7.5	15	298	11.3	29	237	2.5	25	298	8.0	21	250	4.1	15	258	4.6	17	288	5.9	23	286	10.5	12	301	6.3
5,000	25	250	2.2	26	284	3.6	20	282	11.3	23	282	11.9	19	280	9.6	10	298	8.6	28	248	5.0	23	284	10.2	20	230	5.2	12	271	6.4	16	292	6.7	21	302	12.7			
6,000	25	263	3.3	25	300	6.8	19	280	13.0	17	302	10.9	17	275	12.3				27	262	5.8	20	286	10.6	18	245	7.4	11	275	7.8	16	281	10.2	20	299	15.7			
8,000	23	263	8.1	20	301	9.9	16	282	18.7				14	280	18.6				23	283	9.5				13	233	6.3				12	278	15.9	14	294	17.3			
10,000	17	275	9.7	16	303	9.7	11	287	20.8										15	299	14.1																	
12,000	10	285	12.5	10	300	11.9													13	279	18.9																	
14,000																																							

TABLE 2.—*Free-air resultant winds based on pilot balloon observations made near 2200 G. C. T., during October 1948. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Speeds in meters per second*—Continued

Altitude (Meters) m. s. l.	Oakland, Calif. (8 m.)			Oklahoma City, Okla. (396 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (338 m.)			Rapid City, S. Dak. (982 m.)			St. Cloud, Minn. (318 m.)			St. Louis, Mo. (181 m.)			San Antonio, Tex. (240 m.)			San Diego, Calif. (13 m.)			Sault Ste. Marie, (221 m.) Mich.			Seattle, Wash. (116 m.)			Spokane, Wash. (725 m.)			Washington, D. C. (24 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	31	267	3.9	31	204	1.9	31	225	1.0	31	149	1.2	30	351	2.3	30	199	1.5	29	179	0.6	31	116	1.3	31	275	3.7	24	274	0.5	28	340	1.2	30	238	0.9	29	303	1.5
500	31	294	2.6	31	215	2.1	31	247	1.4	31	157	1.3	---	---	---	30	226	1.7	29	232	1.1	31	117	2.3	31	277	2.8	24	275	1.3	28	207	.9	---	---	---	29	292	2.6
1,000	29	298	1.2	31	222	2.6	30	235	2.6	31	148	1.9	30	351	2.3	30	256	2.0	29	246	2.3	31	110	1.8	30	216	.9	24	246	1.7	27	214	2.7	30	220	1.7	28	300	2.7
1,500	29	265	1.2	30	225	3.8	29	242	4.2	31	153	2.2	30	324	3.1	29	257	3.8	29	261	3.8	31	114	2.5	27	148	1.7	21	227	2.3	26	219	4.1	30	217	3.5	27	303	3.5
2,000	28	243	1.3	30	237	4.3	28	270	6.2	30	161	2.9	30	295	4.7	26	270	4.5	25	286	4.5	30	156	1.9	25	149	2.6	16	197	2.3	21	213	5.2	28	228	4.8	26	310	5.2
2,500	28	243	1.8	29	247	5.2	28	280	7.4	29	170	3.2	29	285	6.0	25	288	6.1	24	292	5.7	26	192	2.0	23	137	3.0	14	251	2.2	19	227	4.2	27	229	6.5	24	304	5.4
3,000	27	215	1.1	29	261	5.3	28	286	7.9	28	171	2.4	28	289	7.3	25	294	6.6	24	297	7.2	21	184	1.4	21	138	2.7	13	302	3.2	19	231	5.4	26	239	7.6	22	303	8.2
4,000	27	251	1.6	23	299	7.8	27	289	9.7	28	223	2.7	25	300	8.7	22	300	9.1	22	297	8.8	17	275	3.2	21	193	2.5	13	299	4.6	16	237	6.7	24	250	8.6	17	286	10.7
5,000	25	280	4.1	21	303	8.3	26	295	10.2	25	266	3.8	25	300	10.1	20	300	9.4	19	308	9.3	15	284	5.4	20	241	4.3	12	296	4.8	15	247	8.6	24	256	9.8	16	283	11.1
6,000	22	268	4.4	17	290	7.0	23	302	10.8	23	270	7.9	23	304	10.7	20	306	11.8	17	307	10.8	12	287	8.8	18	258	6.8	---	---	---	11	252	8.3	18	240	9.8	14	286	12.1
8,000	19	291	3.6	11	286	12.4	20	303	13.4	14	265	13.8	21	301	12.4	14	310	14.7	14	308	10.5	---	---	---	13	260	11.7	---	---	---	10	270	10.6	11	285	8.1	---	---	---
10,000	15	273	8.5	---	---	---	18	307	15.4	---	---	---	16	309	14.3	12	308	13.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,000	11	287	9.1	---	---	---	15	291	10.9	---	---	---	12	306	17.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 3.—*Free-air resultant winds based on rawin observations made near 0300 G. C. T., during October 1948. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Speeds in meters per second*

Altitude (meters) m. s. l.	Albuquerque, N. Mex. (1,636 m.)			Big Spring, Tex. (774 m.)			Bismarck, N. Dak. (505 m.)			Brownsville, Tex. (7 m.)			Caribou, Maine (191 m.)			Charleston, S. C. (13 m.)			Columbia, Mo. (237 m.)			Grand Junction, Colo. (1,473 m.)			Greensboro, N. C. (275 m.)			Hatteras, N. C. (3 m.)			International Falls, Minn. (358 m.)			Little Rock, Ark. (80 m.)			Miami, Fla. (12 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	31	125	2.3	30	137	3.4	31	3	0.6	31	69	1.1	28	288	1.9	31	358	0.4	31	115	1.4	31	92	0.3	28	337	0.4	30	344	2.3	31	158	0.9	31	338	0.2	30	45	1.9
500	---	---	---	---	---	---	---	---	---	31	97	4.9	28	312	3.4	31	28	2.2	31	183	1.3	---	---	---	28	321	1.3	30	346	4.0	31	198	2.2	31	162	2.0	30	77	5.2
1,000	---	---	---	31	150	5.7	27	300	2.7	31	96	4.2	26	322	4.0	31	341	1.8	31	256	3.1	---	---	---	28	294	3.2	30	337	3.7	31	238	3.3	31	220	2.2	30	83	4.7
1,500	---	---	---	31	174	5.1	27	300	4.6	31	90	2.5	26	314	4.1	31	323	2.2	31	254	4.5	31	107	.4	28	296	3.9	30	318	4.5	31	257	4.3	31	263	3.3	30	88	4.4
2,000	31	219	1.9	30	201	3.5	28	310	5.6	31	90	1.3	25	306	3.5	31	289	2.9	31	286	5.3	31	267	.9	26	308	4.6	30	297	5.8	31	279	3.7	30	282	4.1	30	85	1.9
2,500	31	242	2.6	30	233	3.5	28	308	7.6	31	31	.9	22	293	4.6	31	273	4.3	31	287	6.7	31	270	1.2	26	300	5.6	30	292	6.3	31	297	4.0	30	289	4.0	30	211	.6
3,000	31	266	3.1	30	258	4.0	30	306	8.1	31	327	1.1	22	272	4.7	31	275	5.9	31	292	7.7	31	260	1.9	25	298	7.0	31	280	7.5	31	290	4.7	29	294	4.3	30	242	1.9
4,000	31	270	4.3	30	275	5.1	29	304	9.6	31	285	2.9	13	272	8.5	31	277	8.2	31	290	8.5	31	251	2.9	20	297	9.5	31	264	9.9	31	290	6.3	28	289	7.4	29	260	3.8
5,000	31	264	6.0	28	281	5.7	28	305	10.9	31	273	5.0	12	277	8.0	31	274	11.1	31	289	10.3	31	269	4.5	18	295	11.2	31	270	12.7	31	304	7.9	25	283	8.3	27	266	5.3
6,000	28	274	6.0	28	272	8.6	27	304	10.3	31	264	6.5	---	---	---	31	277	13.9	31	286	11.5	29	281	6.2	13	288	12.0	31	268	15.3	31	304	9.1	21	257	9.5	26	263	7.4
8,000	26	269	10.1	23	273	13.0	25	292	8.6	30	257	11.7	---	---	---	28	271	18.7	28	294	14.7	26	269	5.1	---	---	---	26	272	17.3	25	264	8.3	17	263	13.7	26	257	13.0
10,000	13	286	7.4	17	269	24.4	25	285	8.9	30	257	17.3	---	---	---	25	268	27.8	26	291	16.7	26	271	9.7	---	---	---	20	267	26.2	24	264	10.5	13	246	15.7	26	263	17.3
12,000	---	---	---	---	---	---	19	281	13.6	30	259	19.8	---	---	---	15	268	29.6	22	284	15.2	23	279	14.0	---	---	---	18	267	35.3	22	265	14.8	10	239	20.2	25	260	19.7
14,000	---	---	---	---	---	---	17	284	10.8	25	260	17.6	---	---	---	---	---	---	18	284	15.8	18	285	10.9	---	---	---	---	---	---	13	283	7.8	---	---	---	20	261	19.7
16,000	---	---	---	---	---	---	10	286	7.4	18	263	13.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Altitude (meters) m. s. l.	Nantucket, Mass. (14 m.)			Nashville, Tenn. (180 m.)			New Orleans, La. (6 m.)			Oakland, Calif. (6 m.)			Oklahoma City, Okla. (392 m.)			Rapid City, S. Dak. (980 m.)			St. Cloud, Minn. (318 m.)			San Antonio, Tex. (242 m.)			San Juan, P. R. (28 m.)			Santa Maria, Calif. (72 m.)			Sault Ste. Marie, Mich. (221 m.)			Spokane, Wash. (726 m.)			Tatoosh Island Wash. (33 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	29	50	1.0	31	180	1.1	31	54	1.2	29	285	2.2	30	146	2.2	31	277	2.3	29	340	0.4	31	117	2.1	31	158	1.4	31	260	1.0	31	141	0.2	31	198	0.6	30	67	2.4
500	29	349	1.1	31	210	.9	31	77	3.6	27	300	2.3	28	157	3.4	---	---	---	29	250	.7	31	121	4.2	31	102	4.1	31	359	1.7	31	173	1.3	---	---	---	28	166	2.5
1,000	29	337	1.5	30	243	2.1	31	69	3.3	26	306	.5	27	183	3.3	31	276	2.3	28	297	2.5	31	128	3.5	31	93	4.3	31	49	2.1	31	231	2.8	30	236	.7	28	186	4.4
1,500	28	281	1.7	30	260	2.5	31	71	2.3	25	189	.8	28	211	3.3	31	285	3.0	27	304	5.2	31	129	2.4	31	87	4.2	31	69	2.1	30	253	2.2	30	248	2.2	29	207	4.6
2,000	27	280	1.4	30	285	3.6	31	47	.7	24	168	1.0	28	249	3.3	30	290	5.5	28	296	5.3	31	177	1.1	31	85	3.9	31	75	1.6	30	272	3.1	31	243	3.8	30	217	4.9
2,500	25	285	2.5	29	297	4.7	31	320	1.6	24	189	.8	28	272	4.7	30	298	7.3	28	298	6.1	31	215	.8	31	87	3.7	31	76	1.4	30	269	4.0	31	242	5.1	30	230	5.5
3,000	24	281	3.4	29	294	6.2	31	289	3.1	24	190	1.1	29	275	6.5	30	310	8.4	28	302	7.6	31	266	1.9	31	78	3.5	30	267	1.8	30	275	3.8	31	247	7.1	29	240	6.1
4,000	20	262	7.0	29	293	9.9	29	289	5.2	22	267	2.5	28	282	8.1	30	308	9.2	28	299	8.2	31	276	3.8	31	74	3.5	30	277	3.6	26	309	4.5	31	264	8.4	29	246	8.0
5,000	18	262	9.9	25	290	11.0	29	279	8.1	22	282	4.7	28	289	9.3	30	299	11.0	28	301	9.2	31	278	7.0	31	74	2.9	30	277	5.8	25	305	6.1	28	271	8.8	28	249	10.1
6,000	15	260	12.1	24	289	13.3	28	274	11.4	22	280	5.3	28	291	10.7	29	292	11.6	26	304	9.4	31	275	9.1	31	61	2.2	29	277	8.3	23	313	6.7	26	271	9.2	28	250	13.5
8,000	11	258	14.0	20	278	17.6	27	268	18.1	11	259	11.2	28	277	13.1	28	298	7.7	23	290	10.7	31	266	14.0	31	62	1.8	26	283	8.5	21	300	10.3	20	268	10.2	23	250	16.5
10,000	---	---	---	14	284	23.6	26	257	25.3	---	---	---	25	274	19.1	28	294	11.7	22	291	11.1	29	257	23.2	31	19	3.2	20	284	15.1	16	284	9.6	17	269	11.2	19	250	16.5
12,000	---	---	---	---	---	---	24	264	30.9	---	---	---	22	273	21.2	26	282	15.4	19	290	13.0	26	267	27.2	31	356	6.9	16	277	23.2	10	284	10.9	13	268	8.0	16	265	19.8
14,000	---	---	---	---	---	---	15	263	30.1	---	---	---	12	277	17.1	15	285	11.1	15	295	9.4	16	261	20.3	31	2	6.7	12	281	17.4	---	---	---	---	---	---	14	260	17.2
16,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	312	8.6	---	---	---	22	8	5.4	---	---	---	---	---	---	---	---	---	---	---	---

NOTE:—Resultants prepared from rawins at high altitudes are biased toward lower wind speeds. Values appearing in this table should therefore be used with caution when the number of observations missing is greater than three. See note following Table 3 in the June 1948 issue of the MONTHLY WEATHER REVIEW.

RIVER STAGES AND FLOODS FOR OCTOBER 1948

ELMER R. NELSON

River stages during October were above normal in the Missouri and Upper Mississippi River Basins, and in portions of the Ohio River Basin in Ohio and Tennessee. It was mostly below normal in other portions of the country except in the Sacramento and Potomac River Basins and at scattered points throughout the Southern States. River stages were below normal in the New England States for the 4th consecutive month. The greatest negative departure was at Vicksburg, Miss., where the Mississippi averaged 8.8 feet below normal. The greatest positive departure was at Swan Lake, Miss., where the Tallahatchie averaged 3.6 feet above normal. The only flooding during the month was on the Cape Fear and Neuse Rivers in North Carolina and on the Edisto in South Carolina.

Precipitation during the month was below normal throughout the country except at a few scattered coastal and inland points, averaging approximately one-half normal. The greatest precipitation (twice normal) occurred in the southwestern tip of the Southern Plateau States.

Heavy rains occurred in southern Florida in connection with the hurricane of October 5. Rainfall amounts varied from 1 inch in the lower Kissimmee River Basin, to 5.5 to 11.3 inches in the middle and lower Everglades. Sixteen inches was reported near Deerfield Beach, in the Hillsboro Canal Basin. A peak flow of 17,400 c. f. s. was reached on the Kissimmee River just above the mouth, at Lake Okeechobee, exceeding the previous maximum of September 1933 by 1,800 c. f. s.

Atlantic Slope drainage.—Light flooding occurred in the lower Cape Fear on the 7th and in the Neuse River at Smithfield on the 8th as a result of the heavy rain (averaging nearly 2 inches), over the watersheds of eastern North Carolina on the 4th and 5th. This rain was caused by an intense disturbance which moved up the Carolina Coast with the rain area spreading inland over most of the State. Near bank-full stages were reached on the Tar and Roanoke Rivers.

Light flooding occurred on the Edisto River at Orangeburg and Givhans Ferry Park in South Carolina during the first half of October. No damage was reported except that the water at the waterworks at Orangeburg was adversely affected by the extremely heavy rainfall at and above that point.

FLOOD STAGE REPORT FOR OCTOBER 1948

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE					
	Feet			*Feet*	
Neuse: Smithfield, N. C.	13	8	8	13.3	8
Cape Fear: Elizabethtown, N. C.	20	7	7	21.3	7
Edisto:					
Orangeburg, S. C.	8	1	8	8.9	2
Givhans Ferry, S. C.	10	1	16	12.9	12

[1] Provisional.

CLIMATOLOGICAL DATA FOR OCTOBER 1948

CONDENSED CLIMATOLOGICAL SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS

[For description of tables and charts, see REVIEW, January 1943, p. 15]

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Section	Temperature								Precipitation					
	Section average	Departure from the normal	Monthly extremes						Section average	Departure from the normal	Greatest monthly		Least monthly	
			Station	Highest	Date	Station	Lowest	Date			Station	Amount	Station	Amount
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	62.0	−2.9	Ozark	89	16	Valley Head	23	20	1.47	−1.11	Ozark	5.90	Gulf Shores	.04
Arizona	62.6	+1.5	3 stations	106	1 3	Maverick	14	1 24	1.16	+.28	McNary	3.38	Seligman	T
Arkansas	60.3	−2.8	2 stations	90	1 1	Bethesda	20	18	2.40	−.76	Eagle Gap	6.06	Beech Grove	.40
California	61.0	−.1	Brawley	109	5	3 stations	7	30	.73	−.36	Klamath	6.12	18 stations	.00
Colorado	47.3	+.3	Eversoll Ranch	91	4	Spicer	−12	17	.73	−.40	Wolf Creek Pass	4.32	2 stations	.00
Florida	71.4	−1.6	Stuart	96	3	Marianna Ind. School	35	19	4.92	+.74	Pompano	17.41	Grape Hammock	.56
Georgia	62.0	−2.9	2 stations	87	1 3	Blairsville Exp. Sta	22	19	2.72	+.03	Doles	8.08	Pine Mountain Valley	.39
Idaho	47.8	+.5	Anderson Dam	87	12	Grouse	5	17	.71	−.81	2 stations	2.62	Challis	T
Illinois	52.9	−3.0	2 stations	85	1	Aurora College	16	18	1.79	−.85	Lawrenceville, 5 S	5.06	Sycamore	.37
Indiana	52.3	−2.9	do	82	1 29	2 stations	17	18	2.24	−.50	Franklin	4.19	La Porte	.23
Iowa	51.5	−1.1	Monroe	80	26	4 stations	16	17	1.91	−.40	Bedford	3.41	Lake View	.38
Kansas	57.0	−.5	Meade	94	4	Atwood	17	11	1.14	−.84	Independence	3.43	3 stations	T
Kentucky	54.8	−3.7	4 stations	85	1 1	Farmers	18	19	2.26	−.37	Murray	3.81	Stillwater	.28
Louisiana	66.3	−2.2	3 stations	93	1 1	Pollock	24	19	1.15	−2.05	Sarepta	3.82	Donaldsonville	.02
Maryland-Delaware	54.2	−2.2	Coleman, Md	88	1	Cumberland, Md	19	19	3.50	+.47	Georgetown, Del	6.81	Elkton, Md	1.02
Michigan	47.9	−1.0	Ontonagon	78	26	2 stations	15	18	1.32	−1.35	Sault Ste. Marie	3.68	Jackson	.33
Minnesota	48.2	+1.5	Taylors Falls, 1 NE	80	1	Angus	11	17	.83	−1.01	Albert Lea	2.06	Caribou, 2 S	.10
Mississippi	63.1	−2.4	Eupora	90	15	Hernando	24	30	1.14	−1.40	Paulding	3.77	2 stations	.03
Missouri	55.7	−2.2	2 stations	86	1	Anderson	18	18	2.38	−.58	St. Louis Ap	4.53	Neosho	.76
Montana	46.2	+1.0	Crow Agency	94	3	Wibaux, 2 E	1	17	.18	−.89	Haugan	1.65	12 stations	.00
Nebraska	51.9	.0	Chadron	89	4	Garden	6	17	1.00	−.47	Falls City	3.76	Oxford	T
Nevada	53.2	+2.0	Overton	100	3	Smith	5	28	.54	−.14	Jarbidge	1.54	Lathrop Wells	.00
New England	48.6	−1.0	Winslow, Maine	84	1	Somerset, Vt	11	22	3.06	−.39	Pembroke, Mass	8.20	Danbury, Conn	.74
New Jersey	53.6	−1.2	Hammonton	81	2	Layton	16	22	2.29	−1.23	Cape May	5.69	Quakertown	1.11
New Mexico	54.6	+.8	White Sands	95	13	Eagle Nest	7	22	1.15	−.01	Jemez Springs	3.95	Floyd	T
New York	48.8	−1.3	7 stations	80	1 1	Indian Lake	11	22	2.96	−.34	South Wales	6.86	Millerton	.91
North Dakota	46.4	+2.2	Dunn Center	85	4	Medora	−1	17	.93	−.08	Sharon	2.16	Grenora	.13
Ohio	50.4	−2.9	Chesapeake	84	16	Mansfield, 6 N	19	21	2.39	−.13	Geneva	4.04	New Lexington, 1 N	.76
Oklahoma	61.0	−1.7	Cordell	96	13	Jay	19	18	.93	−2.02	Idabel	6.35	Lake Overholser	T
Oregon	48.9	−.9	2 stations	88	1 1	Fremont	−1	28	1.60	−.30	Valsetz	9.75	Paisley	T
Pennsylvania	50.3	−2.3	Phoenixville	85	1	2 stations	14	1 21	3.09	−.14	South Mountain	5.99	Allentown-Beth.-East	.96
South Carolina	59.7	−4.2	Conway	85	1	Walhalla	25	19	2.77	−.14	Orangeburg, No. 2	7.76	Batesburg	.79
South Dakota	49.4	+.5	McIntosh	90	4	Ralph	2	17	1.23	.00	Vermillion	2.47	Camp Crook	.08
Tennessee														
Texas	65.8	−1.9	2 stations	99	1 7	Stratford	24	18	1.38	−1.31	Carrizo Springs	6.60	12 stations	.00
Utah	50.3	+.9	St. George	98	1 3	Bryce Canyon	5	29	1.15	.00	Pineview Dam	3.44	Callao	.00
Virginia	54.4	−3.1	4 stations	83	1 2	3 stations	17	1 19	3.23	+.25	Luray	5.86	Emory	1.05
Washington	47.8	−2.4	Richland, 2 SW	83	4	Chewelah, 2 S	12	17	2.19	−.82	Mt. Baker Lodge	10.85	2 stations	.26
West Virginia	51.5	−3.2	Williamson	83	3	2 stations	14	1 19	2.38	−.44	Harpers Ferry	5.66	Brownsville	1.28
Wisconsin	48.2	−.3	2 stations	82	1	Winter P.K. Reservoir	7	18	1.01	−1.38	Ridgeway	2.95	Ladysmith R. S	.18
Wyoming	45.4	+1.5	Arvada	89	3	Foxpark	0	17	.68	−.42	Kirtley	2.45	2 stations	T
Alaska (Sept.)	41.1	−2.8	2 stations	72	3	Umiat	−6	28	4.29	+.65	Little Port Walter	35.95	Nenana	.27
Hawaii	73.6	−.4	4 stations	90	1 1	Haleakala R. S	37	9	6.04	+.37	Makahanoloa, No. 2	42.60	12 stations	.00
Puerto Rico	78.2	+.1	Ponce	96	1 30	2 stations	58	1 2	9.09	+.69	Guineo Reservoir	20.97	Cambalache Exp. Sta	2.48

1 Other dates also.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS, OCTOBER 1948

District and station	Elevation of instruments: Barometer above sea level [1]	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Averages: Mean maximum	Mean minimum	Mean	Departure from normal	Extremes: Highest	Date	Lowest	Date	Greatest daily range	Total heating degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Departure from normal	Greatest in 24 hours	Days with 0.01 inch or more	Days with thunderstorms	Total snowfall (unmelted)	Snow, sleet, and ice on ground at end of month	Wind: Average hourly speed	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Character of day (sunrise to sunset), number of days: Clear	Partly cloudy	Cloudy	Average cloudiness, tenths (sunrise to sunset)	Possible sunshine
NEW ENGLAND	Ft.	Ft.	Ft.	Mb.	Mb.	Mb.	°F.	°F.	°F.	°F.	°F.		°F.		°F.		°F.	%	In.	In.	In.			In.	In.	M. p.h.					0-3	4-7	8-10	0-10	%
									48.6	+.3								80	3.58	.0														5.8	
Caribou [2]	628	5	33	995.9	1,019.6	----	53	33	43.2	+1.7	72	7	20	21	36	678	36	85	4.63	+1.1	1.65	10	0	.8	.0	----	nw.	--	------	--	7	8	16	6.5	--
Eastport	75	67	82	1,015.6	1,018.3	+2.4	54	42	47.9	+.4	68	6	27	19	26	530	40	78	3.26	-.3	.83	9	1	T	.0	10.4	n.	32	se.	9	12	7	12	5.6	56
Portland, Maine [2]	103	6	43	1,014.9	1,018.6	+1.3	60	36	47.8	-.9	76	2	21	19	34	526	40	82	3.34	+.2	.98	9	0	.0	.0	9.2	n.	34	n.	25	8	13	10	5.5	59
Concord [2]	289	5	45	1,008.5	1,019.6	+2.3	62	33	47.4	-.4	76	1	17	19	42	546	38	79	1.44	-1.4	.81	9	0	.0	.0	6.4	nw.	22	e.	8	12	9	10	5.4	55
Mt. Washington	6,274	5	37	806.9	1,022.8	----	36	26	31.2	+1.5	49	1	6	19	28	1,049	25	79	4.59	-1.7	1.81	12	1	.35	.0	28.3	w.	--	------	--	8	9	14	6.1	45
Burlington [2]	403	6	51	1,004.4	1,019.6	+3.0	57	36	46.2	-3.0	73	1	23	19	34	579	39	85	2.51	-.5	.96	9	1	T	.0	7.7	n.	32	s.	16	4	12	15	6.6	36
Boston [2]	124	33	62	1,014.2	1,018.8	+1.5	62	46	54.2	+.6	79	1	33	19	28	341	42	72	4.84	+1.7	1.50	10	1	.0	.0	11.2	nw.	40	ne.	25	10	10	11	5.6	58
Nantucket [2]	12	4	34	1,017.3	1,017.6	.0	59	47	53.1	-1.1	75	2	29	22	23	370	48	85	7.22	+3.8	3.21	11	1	.0	.0	14.1	ne.	42	ne.	24	6	8	17	6.5	48
Block Island	26	11	46	1,016.6	1,017.6	.0	60	50	54.9	.0	72	2	38	19	25	314	48	82	3.28	-.3	1.23	11	0	.0	.0	17.2	ne.	57	ne.	24	13	5	13	5.4	54
Providence [2]	159	65	60	1,012.5	1,018.3	+.7	63	45	54.0	+1.8	83	1	29	22	30	351	44	79	4.85	+1.7	1.74	10	2	.0	.0	8.5	n.	32	sw.	17	11	6	14	5.5	56
Hartford [2]	159	5	44	1,012.9	1,019.0	+1.0	64	40	51.8	+.6	82	1	26	22	45	414	41	78	1.46	-2.1	.49	9	0	.0	.0	8.0	n.	29	s.	17	8	11	12	5.9	56
New Haven [2]	107	5	39	1,014.6	1,018.6	+.3	63	44	53.8	+2.0	78	2	28	19	32	349	43	74	1.54	-1.8	.82	9	1	.0	.0	8.1	ne.	26	ne.	25	10	12	9	5.4	55
MIDDLE ATLANTIC																																		5.9	
									54.8	-1.3								77	2.36	-.9															
Albany [2]	97	6	40	1,015.2	1,019.0	+1.4	60	37	48.6	-.7	76	2	20	22	38	509	40	82	2.42	.0	1.15	8	0	T	.0	7.3	n.	26	se.	17	3	16	12	6.5	42
Binghamton [4]	871	57	79	987.5	1,020.0	+1.7	60	39	49.4	-.6	73	1	24	22	36	482	40	86	2.23	-.7	1.19	11	0	1.0	.0	4.9	n.	17	sw.	8	8	7	16	6.4	48
New York [4]	314	415	454	1,007.5	1,019.0	+1.0	63	49	55.9	-.4	78	1	35	19	21	289	44	68	2.44	-1.1	.98	8	0	T	.0	13.5	n.	39	n.	24	10	11	10	5.6	56
Allentown [2]	385	4	58	1,005.1	1,019.3	----	63	40	51.6	-1.4	74	2	25	19	38	418	40	76	.96	-2.3	.29	7	0	.0	.0	----	nw.	--	------	--	7	12	12	6.3	--
Harrisburg [2]	374	30	49	1,005.8	1,019.6	+.6	62	43	52.8	-2.0	79	2	30	19	31	382	42	74	3.45	+.5	1.61	9	1	.0	.0	6.8	nw.	26	nw.	25	6	8	17	6.5	52
Philadelphia [4]	114	174	150	1,014.6	1,018.6	-.4	64	50	56.8	-1.0	78	1	37	19	25	268	44	76	1.39	-1.4	.46	9	0	.0	.0	8.3	n.	24	n.	25	8	12	11	5.5	57
Reading	323	47	306	1,007.1	1,019.3	+.3	64	45	54.4	-1.0	77	2	31	19	33	330	----	--	1.49	-1.6	.59	10	0	.0	.0	10.1	n.	33	ne.	5	7	10	14	6.3	41
Scranton	805	72	104	989.8	1,019.3	+.7	60	42	51.2	-.7	71	1	28	19	33	434	----	--	1.92	-1.1	1.13	12	0	.2	.0	6.2	n.	22	nw.	17	3	18	10	6.2	43
Atlantic City	52	37	172	1,015.9	1,018.0	-.6	63	51	56.6	-.3	76	2	36	19	24	267	49	82	3.19	.0	1.80	12	1	.0	.0	17.5	n.	58	ne.	5	5	10	16	6.4	53
Newark [2]	30	55	46	1,017.6	1,018.6	----	64	46	55.0	-.6	80	1	30	19	32	318	44	74	1.89	-1.9	.69	10	0	.0	.0	----	ne.	--	------	--	6	13	12	5.8	--
Trenton	190	89	107	1,011.9	1,019.0	+.7	63	46	54.8	-.8	77	1	32	19	26	323	----	--	1.27	-1.5	.52	10	0	.0	.0	9.5	n.	32	n.	24	10	10	11	5.6	40
Baltimore [4]	123	100	215	1,014.6	1,019.0	+.4	64	50	56.7	-1.5	80	1	37	19	25	268	44	72	3.62	+.7	1.90	6	0	.0	.0	10.3	n.	28	nw.	18	7	10	14	5.9	57
Washington [4]	112	56	100	1,015.2	1,019.3	+.3	65	48	56.2	-1.2	79	1	33	19	30	283	46	72	3.11	+.3	1.72	8	0	.0	.0	7.5	n.	25	ne.	5	7	10	14	6.3	59
Cape Henry	18	8	54	1,017.3	1,018.0	-.3	66	53	59.4	-2.7	78	10	40	20	25	195	52	82	2.45	-.6	2.09	6	0	.0	.0	14.5	n.	49	e.	5	12	6	13	5.3	69
Lynchburg [2]	686	5	58	994.6	1,019.6	+.3	66	44	55.0	-2.2	77	1	26	19	34	314	43	74	2.61	-.5	1.81	7	0	.0	.0	8.3	n.	25	n.	5	13	6	12	4.8	65
Norfolk [4]	91	80	125	1,015.2	1,018.6	-.4	67	53	60.1	-2.4	80	1	42	20	24	174	50	80	2.41	-.6	1.91	9	0	.0	.0	9.8	n.	32	e.	5	11	7	13	5.5	60
Richmond [4]	144	11	52	1,013.2	1,018.6	-.7	68	48	57.8	-1.8	82	1	33	19	32	240	46	83	3.27	+.4	2.33	9	0	.0	.0	7.6	n.	25	nw.	5	12	8	11	5.3	57
SOUTH ATLANTIC																																		4.4	
									60.8	-2.8								74	2.29	-.9															
Asheville	2,253	77	92	945.8	1,021.0	+1.0	67	42	54.4	-.9	79	2	27	19	44	329	41	76	.93	-1.8	.74	6	0	.0	.0	6.8	nw.	27	nw.	18	12	11	8	4.7	65
Charlotte [4]	779	63	86	991.5	1,019.3	.0	70	49	59.6	-2.1	81	1	34	19	31	184	46	68	2.38	-.6	1.64	7	0	.0	.0	5.7	ne.	19	ne.	4	14	11	6	4.2	73
Greensboro [2]	886	6	56	988.2	1,020.3	+.7	68	42	55.5	-3.0	80	1	28	19	41	302	44	70	2.28	-.8	1.84	7	0	.0	.0	7.3	n.	27	n.	5	15	10	6	3.9	66
Hatteras	11	5	47	1,017.3	1,017.6	-.4	67	57	62.2	-3.7	76	3	46	20	21	121	56	80	1.92	-3.6	1.38	7	1	.0	.0	12.0	n.	34	e.	5	13	4	14	5.3	60
Raleigh [4]	376	5	71	1,003.4	1,019.6	+.6	69	48	58.7	-3.3	79	1	34	19	31	209	47	76	2.80	-.1	2.30	8	0	.0	.0	8.3	n.	19	n.	4	8	10	13	5.7	53
Wilmington	72	73	107	1,017.6	1,019.3	+.7	70	52	61.2	-4.1	79	1	38	19	29	143	51	79	1.93	-1.3	1.43	8	0	.0	.0	8.0	n.	26	nw.	18	16	4	11	4.5	65
Charleston [4]	48	11	92	1,016.9	1,018.6	+.3	72	56	63.8	-4.0	80	14	43	19	22	87	52	79	2.64	-.6	1.21	7	1	.0	.0	9.1	n.	29	n.	18	18	6	7	3.9	71
Columbia, S.C. [4]	347	70	91	1,011.2	1,019.3	+.3	73	50	61.5	-2.8	80	14	38	20	34	134	49	76	2.70	+.1	1.69	7	0	.0	.0	6.5	ne.	23	ne.	4	17	7	7	3.9	69
Greenville, S.C. [2]	1,040	18	36	982.1	1,019.3	+.7	70	48	59.0	-1.2	81	1	35	19	30	191	45	66	1.08	-2.0	.47	6	0	.0	.0	7.7	ne.	33	n.	18	15	9	7	4.2	70
Augusta [4]	182	62	77	1,003.7	1,019.0	+.7	74	50	62.2	-3.1	82	14	38	20	38	120	48	64	1.90	-.6	1.32	7	0	.0	.0	4.8	nw.	19	ne.	4	18	6	7	3.7	74
Savannah [2]	65	19	51	1,016.9	1,018.6	+.6	75	53	64.0	-1.7	82	14	42	19	33	78	54	74	2.54	-.4	1.14	5	0	.0	.0	8.1	n.	26	n.	4	15	9	7	4.3	63
Jacksonville [4]	43	86	110	1,016.9	1,018.0	+.7	76	60	68.0	-3.1	83	1	47	20	24	37	58	79	4.43	.0	2.87	8	3	.0	.0	7.8	ne.	23	sw.	11	.4	7	10	4.8	55
FLORIDA PENINSULA																																		5.6	
									77.0	-.2								78	6.90	+1.3															
Key West	21	10	64	1,013.9	1,014.6	+.7	84	76	79.8	+.7	88	7	73	31	10	0	71	78	5.74	-.3	4.55	6	3	.0	.0	10.9	e.	45	n.	5	11	10	10	5.6	55
Miami [4]	25	242	249	1,013.9	1,014.6	-.3	81	73	76.9	-1.1	85	8	67	20	15	0	69	80	13.94	+6.2	6.02	13	1	.0	.0	15.1	ne.	79	nw.	5	6	16	9	6.2	49
Tampa [2]	35	5	36	1,015.9	1,016.3	+.4	84	65	74.2	-.1	92	3	57	20	26	0	64	75	1.02	-2.1	.53	4	2	.0	.0	7.2	ne.	24	sw.	4	9	15	7	5.0	60
EAST GULF																																		4.3	
									64.6	-2.3								74	1.58	-1.3															
Atlanta [2]	1,173	33	72	984.4	1,019.3	+.3	72	49	60.4	-2.3	80	2	32	18	37	158	47	68	.73	-2.0	.31	6	0	.0	.0	7.4	nw.	32	nw.	18	15	10	6	3.8	72
Macon [4]	370	79	87	1,002.4	1,019.0	+.4	74	49	61.1	-3.4	81	14	35	19	35	143	48	66	1.92	-.4	1.11	8	0	.0	.0	5.1	n.	26	nw.	17	15	8	8	4.5	73
Thomasville	273	48	----	1,009.8	1,020.0	+2.7	76	55	65.2	-3.0	84	16	40	19	35	73	----	--	2.14	-.8	.88	7	0	.0	.0	----	------	--	------	--	16	7	8	----	--
Apalachicola	35	11	51	1,016.6	1,017.6	+.7	75	60	67.4	-3.2	81	11	46	19	23	32	60	79	4.93	+1.7	3.30	6	0	.0	.0	7.6	ne.	26	n.	18	17	6	8	4.2	66
Pensacola [4]	56	54	79	1,013.9	1,018.3	+1.0	76	58	67.2	-2.7	84	2	40	18	32	39	56	72	1.22	-3.0	.84	4	1	.0	.0	6.8	ne.	24	n.	17	14	13	4	4.2	76
Anniston	618	6	32	997.6	1,020.3	+2.0	74	43	58.8	-4.2	82	17	29	20	48	200	47	77	.64	-2.0	.35	5	0	.0	.0	----	------	--	------	--	----	----	----	----	--
Birmingham [2]	700	5	63	996.6	1,019.3	+.3	75	46	60.5	-1.9	82	16	29	19	44	154	48	71	.70	-1.7	.36	4	0	.0	.0	6.0	e.	24	nw.	17	16	8	7	3.9	66
Mobile [4]	57	86	161	1,010.5	1,018.6	+1.0	78	57	67.2	-2.1	84	16	39	18	32	43	56	73	1.80	-1.8	1.34	5	1	.0	.0	7.0	n.	28	n.	17	10	16	5	4.6	66
Montgomery [4]	218	92	105	1,011.5	1,019.0	+.4	76	53	64.6	-2.0	84	2	37	18	36	74	50	71	1.85	-.6	1.05	5	1	.0	.0	5.5	n.	21	nw.	17	17	8	6	4.1	73
Meridian [4]	375	67	92	1,007.8	1,019.0	+1.0	78	47	62.4	-1.9	85	15	30	19	44	110	51	76	1.44	-1.0	1.20	4	1	.0	.0	7.3	n.	--	------	--	19	7	5	----	--
Vicksburg [4]	247	82	102	1,009.1	1,018.6	+.3	77	54	65.3	-1.4	85	1	32	18	31	67	49	78	.82	-2.0	.38	4	2	.0	.0	7.1	n.	23	n.	17	14	11	6	4.0	76
New Orleans C. O.	53	76	84	1,016.3	1,018.3	+1.4	79	63	71.0	.0	86	1	44	18	33	24	58	74	1.25	-2.0	1.16	5	0	.0	.0	6.3	ne.	22	ne.	18	11	11	9	5.0	73
New Orleans A. P. [3]	30	6	52	1,015.9	1,018.0	----	80	58	68.8	----	86	16	43	20	34	30	58	78	1.07	----	----	3	1	.0	.0	----	ne.	--	------	--	13	11	7	4.6	
WEST GULF																																		4.9	
									68.8	-.2								69	1.47	-1.6															
Shreveport [2]	181	5	64	1,009.5	1,018.3	+.7	80	51	65.7	-1.3	89	1	32	19	38	71	53	74	1.47	-1.2	.76	4	3	.0	.0	7.0	n.	28	n.	14	15	9	7	4.4	76
Fort Smith [2]	463	6	30	1,001.7	1,018.0	+.7	76	46	60.8	-2.0	89	15	26	18	41	160	44	67	1.94	-1.0	1.23	4	4	.0	.0	6.1	ne.	25	w.	7	14	9	8	4.5	69
Little Rock [2]	265	26	58	1,006.1	1,019.0	+1.0	74	49	61.2	-2.4	83	13	34	18	37	141	48	71	3.11	+.4	1.84	8	4	.0	.0	5.8	nw.	25	ne.	17	15	7	9	4.3	71
Austin [2]	621	5	41	995.9	1,017.6	+.7	82	58	69.9	+1.6	95	14	40	18	35	38	52	60	1.78	-1.4	1.76	4	2	.0	.0	8.4	s.	33	n.	17	13	4	14	5.1	67
Brownsville [3]	20	5	54	1,013.2	1,015.2	+.3	84	64	74.3	-.6	95	11	50	18	31	12	66	82	1.29	-2.3	.86	6	3	.0	.0	9.2	se.	34	nw.	17	6	14	11	5.7	60
Corpus Christi [3]	44	6	33	1,015.9	1,016.6	+.7	83	63	73.2	+2.1	94	2	47	19	35	14	64	82	1.44	----	1.44	1	0	.0	.0	9.4	se.	35	n.	17	13	8	10	4.9	58
Dallas [2]	488	34	45	999.7	1,018.0	+1.1	79	53	66.3	-1.0	92	15	34	18	37	65	48	58	.91	-1.8	.60	3	2	.0	.0	8.4	s.	30	sw.	6	13	9	9	4.6	73
Fort Worth [2]	706	40	56	993.9	1,018.0	+1.1	79	55	66.8	+1.1	92	15	38	18	35	59	48	57	2.09	-.7	1.27	7	5	.0	.0	----	------	--	------	--	13	18	10	4.9	--
Galveston [4]	54	122	129	1,015.9	1,017.6	+.7	77	67	71.7	-1.0	85	1	47	18	23	16	62	80	.31	-4.0	.31	1	1	.0	.0	10.5	e.	31	n.	17	16	9	6	4.2	72
Houston [4]	138	157	190	1,012.5	1,017.6	+.7	82	61	71.5	+1.2	90	1	41	18	28	23	56	75	.09	-3.6	.06	3	1	.0	.0	8.9	se.	29	n.	17	15	6	10	4.6	73
Laredo [3]	418	10	38	1,001.4	1,015.9	----	83	63	73.3	-.4	95	6	49	18	32	15	60	70	2.35	+.2	1.56	4	2	.0	.0	----	se.	--	------	--	9	10	12	5.6	--
Palestine	510	64	72	1,000.3	1,018.6	+1.0	80	56	68.0	+.8	90	14	40	18	32	54	48	55	.51	-2.8	.36	3	1	.0	.0	6.1	n.	22	nw.	6	11	8	12	5.3	67
Port Arthur [4]	34	59	134	1,016.6	1,017.6	+1.0	80	62	70.7	-.9	88	1	39	18	26	27	56	77	.01	-3.4	.01	1	2	.0	.0	10.6	ne.	33	n.	17	15	8	8	4.4	73
San Antonio [3]	794	6	51	992.9	1,016.9	+.6	82	59	70.4	-.1	93	6	44	19	36	32	54	63	3.24	+1.0	3.24	2	2	.0	.0	8.1	ne.	36	ne.	17	12	4	15	5.7	57

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS, OCTOBER 1948—Continued

District and station	Elevation of instruments: Barometer above sea level [1]	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Averages: Mean maximum	Temperature of the air: Averages: Mean minimum	Temperature of the air: Averages: Mean	Temperature of the air: Averages: Departure from normal	Temperature of the air: Extremes: Highest	Temperature of the air: Extremes: Date	Temperature of the air: Extremes: Lowest	Temperature of the air: Extremes: Date	Temperature of the air: Extremes: Greatest daily range	Total heating degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Greatest in 24 hours	Precipitation: Days with 0.01 inch or more	Precipitation: Days with thunderstorms	Precipitation: Total snowfall (unmelted)	Precipitation: Snow, sleet, and ice on ground at end of month	Wind: Average hourly speed	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Character of day (sunrise to sunset), number of days: Clear	Character of day (sunrise to sunset), number of days: Partly cloudy	Character of day (sunrise to sunset), number of days: Cloudy	Average cloudiness, tenths (sunrise to sunset)	Possible sunshine
OHIO VALLEY AND TENNESSEE	Ft.	Ft.	Ft.	Mb.	Mb.	Mb.	°F.	°F.	°F.	°F.	°F.		°F.		°F.		°F.	%	In.	In.	In.			In.	In.	M. p. h.					0-3	4-7	8-10	0-10	%
									54.0	−2.6								74	2.23	−.4															5.5	
Chattanooga [2]	762	6	66	994.9	1,020.0	+.7	72	43	57.6	−.1	82	14	27	19	42	234	46	75	1.48	−1.5	.56	6	0	.0	.0	5.8	s.	32	sw.	17	14	6	11	4.6	60
Knoxville [2]	995	27	71	984.8	1,020.3	+2.0	70	44	57.0	−1.6	80	1	29	19	41	249	44	67	1.27	−1.4	.95	5	0	.0	.0	6.7	ne.	34	sw.	17	13	9	9	4.5	53
Memphis [2]	399	5	49	1,008.8	1,019.0	+.7	74	46	60.0	−1.4	84	15	29	18	42	174	47	69	2.21	−.5	1.06	7	3	.0	.0	6.8	n.	25	nw.	16	18	6	7	3.5	76
Nashville [2]	546	5	72	997.6	1,019.6	+.3	72	44	58.0	−3.0	82	15	28	18	42	226	45	69	1.59	−.9	1.00	3	1	.0	.0	6.3	s.	22	nw.	8	14	13	4	3.9	58
Lexington [2]	989	4	58	984.1	1,021.0	+2.4	65	43	53.8	−3.6	80	16	24	18	37	351	42	73	3.29	+.7	1.43	9	1	.0	.0	----	s.	--	----	--	11	9	11	----	--
Louisville [2]	525	5	54	1,002.4	1,019.3	+.3	67	43	55.1	−2.4	79	1	25	18	46	309	43	69	2.19	−.5	1.40	8	1	.0	.0	6.3	e.	27	sw.	11	9	11	11	5.8	54
Evansville [2]	431	6	40	1,003.7	1,019.3	+.3	67	42	54.8	−2.2	78	30	26	18	41	318	45	75	2.35	−.5	1.84	7	1	.0	.0	6.1	sw.	23	sw.	7	13	10	8	4.4	68
Indianapolis [2]	823	5	54	989.5	1,019.3	+.7	62	40	51.2	−2.9	77	30	22	18	41	427	41	74	2.12	------	1.03	11	1	.0	.0	8.7	se.	34	e.	7	10	10	11	5.5	50
Terre Haute [2]	575	4	36	998.6	1,020.0	+1.7	64	41	52.4	−3.8	76	28	24	18	38	394	43	74	2.32	−.4	1.34	9	1	.0	.0	7.5	se.	29	sw.	7	11	9	11	5.2	62
Cincinnati [4]	627	135	148	997.3	1,020.3	+1.0	64	46	55.0	−2.0	79	30	32	18	37	312	42	72	2.18	−.3	1.25	7	0	.0	.0	4.2	e.	16	n.	17	8	8	15	5.9	52
Columbus [4]	822	90	110	993.6	1,020.0	+1.0	62	44	52.6	−2.6	75	16	29	18	34	380	42	76	1.98	−.5	1.38	8	0	.0	.0	7.6	n.	29	sw.	12	9	5	17	6.1	53
Dayton [2]	1,003	6	55	983.1	1,019.6	+1.3	60	41	50.5	−3.3	73	30	26	18	32	452	41	74	2.24	−.3	1.54	12	2	.0	.0	9.1	w.	33	w.	9	8	10	13	6.2	50
Elkins [2]	1,947	5	45	950.6	1,021.0	+.3	61	36	48.6	−2.5	76	16	21	19	46	512	40	84	2.75	−.2	.82	12	1	.8	.0	5.4	n.	24	sw.	8	4	7	20	7.3	43
Parkersburg	637	77	84	----	----	----	63	42	52.4	−3.7	79	16	29	19	37	390	43	82	2.29	−.2	1.14	10	1	.0	.0	5.4	nw.	17	nw.	19	5	9	17	7.0	44
Pittsburgh [2]	842	39	54	989.2	1,020.0	+1.0	60	42	50.7	−3.4	76	16	30	19	31	444	40	75	3.14	+.6	1.15	14	1	T	.0	9.0	s.	27	w.	8	2	10	19	7.4	18
LOWER LAKES																																	6.7	
									49.4	−2.1								79	2.68	−.2															
Buffalo [2]	768	34	96	991.2	1,019.6	+2.0	58	41	49.6	−1.5	73	7	30	21	31	478	40	80	4.74	+1.4	1.38	11	2	T	.0	10.9	sw.	44	sw.	9	5	8	18	6.9	33
Canton	448	10	61	1,002.7	1,019.0	+2.4	57	35	46.0	−1.5	72	7	20	21	38	588	38	80	2.97	−.1	1.41	11	1	T	.0	6.1	ne.	29	w.	10	7	8	16	6.4	45
Oswego	335	71	85	----	----	----	56	42	49.2	−1.1	71	7	32	22	29	492	----	----	2.69	−.6	1.33	8	0	T	.0	8.0	s.	24	n.	24	6	10	15	6.7	41
Rochester [2]	523	4	69	1,000.3	1,019.6	+1.6	59	39	49.0	−2.5	75	16	28	22	39	494	41	84	2.66	.0	1.28	9	0	T	.0	7.6	sw.	31	sw.	11	6	10	15	6.9	49
Syracuse [2]	596	5	57	997.6	1,020.0	+2.0	60	38	48.8	−.7	76	7	24	22	43	500	41	82	1.87	−1.3	.91	9	0	T	.0	7.7	sw.	26	sw.	9	4	12	15	6.9	33
Erie [4]	714	57	81	993.6	1,020.0	+2.0	58	45	51.4	−2.0	74	16	36	19	26	423	40	81	5.01	+1.3	1.68	15	1	T	.0	7.9	se.	26	w.	9	5	7	19	7.1	36
Cleveland [2]	762	27	54	991.5	1,019.3	+1.0	59	41	50.1	−2.6	72	30	28	21	35	464	41	77	2.86	+.1	1.28	11	3	T	.0	8.9	s.	40	w.	9	3	12	16	7.2	36
Sandusky	629	5	67	996.3	1,019.6	+1.6	58	43	50.8	−3.5	69	7	30	21	25	437	----	--	2.02	−.4	.74	11	2	.0	.0	7.8	sw.	29	w.	9	6	8	17	6.7	39
Toledo [2]	628	5	47	996.3	1,020.0	+1.4	59	39	49.0	−2.6	73	1	25	18	33	497	41	78	1.74	−.6	.68	10	1	.0	.0	9.0	sw.	38	sw.	9	6	8	17	6.7	39
Fort Wayne [2]	857	5	34	988.2	1,019.6	+1.3	60	39	49.6	−3.1	75	1	25	18	40	475	40	76	1.57	−1.0	.56	9	0	.0	.0	7.3	sw.	28	sw.	7	9	10	12	5.9	61
Detroit [2]	730	5	77	992.9	1,020.0	+2.0	58	42	50.1	−1.8	71	1	28	18	27	462	41	75	1.34	−1.0	.43	10	1	.0	.0	8.7	sw.	38	nw.	9	7	9	15	6.5	38
UPPER LAKES																																	5.7	
									48.4	−.5								74	1.06	−1.6															
Alpena	609	5	89	995.9	1,018.6	+1.7	55	40	47.3	+.2	74	1	25	18	28	549	41	80	.78	−1.9	.28	10	0	T	.0	9.5	nw.	29	sw.	10	7	6	18	6.5	46
Escanaba	612	51	72	995.6	1,018.6	+2.0	54	40	47.2	+1.2	62	1	21	18	26	553	40	74	1.56	−1.1	1.08	8	0	T	.0	10.3	s.	33	n.	23	12	7	12	5.3	50
Grand Rapids [4]	707	70	244	992.9	1,019.0	+1.4	59	42	50.7	−.5	76	1	34	20	33	443	38	74	.79	−2.0	.37	5	0	T	.0	9.7	se.	31	w.	9	8	12	11	5.8	48
Lansing [4]	878	5	90	987.1	1,019.3	+1.3	58	38	48.2	−2.1	75	1	24	18	33	520	39	73	1.01	−1.5	.39	9	1	T	.0	8.1	sw.	34	nw.	9	6	12	13	6.2	42
Marquette	734	44	73	990	2 1,018.0	+1.7	56	40	48.0	+1.3	70	26	26	18	28	524	38	72	.54	−2.2	.24	8	1	.1	.0	8.5	s.	32	s.	15	8	10	13	5.7	46
Sault Sainte Marie [2]	614	10	52	995.3	1,018.3	+1.7	53	37	45.0	+2.0	67	1	24	18	32	622	40	84	3.68	+.6	1.25	13	0	7.2	.0	9.8	se.	42	w.	9	4	8	19	7.3	43
Chicago [2]	673	5	38	994.2	1,019.3	+1.3	62	42	51.5	−1.0	80	1	20	18	34	419	40	69	.62	−1.9	.39	7	1	.0	.0	8.7	s.	30	w.	9	8	13	10	5.5	65
Green Bay	617	5	32	995.6	1,018.3	+1.7	59	37	48.0	−.5	71	26	18	18	36	528	37	67	.71	−1.8	.26	5	1	.0	.0	12.4	sw.	42	se.	7	10	10	11	5.2	55
Milwaukee [2]	681	33	66	993.6	1,019.3	+2.0	59	41	50.2	+.7	72	1	21	18	31	460	40	70	.33	−2.0	.26	4	0	.0	.0	11.3	nw.	41	nw.	15	15	5	11	4.7	61
Duluth [4]	1,133	5	47	975.6	1,017.3	+1.4	57	39	48.1	+4.0	69	15	19	17	33	522	35	73	.54	−1.8	.27	3	0	T	.0	11.3	nw.	41	nw.	15	15	5	11	4.7	61
NORTH DAKOTA																																	4.6	
									46.8	+3.3								60	.98	−.2															
Fargo [2]	940	5	47	981.4	1,015.9	.0	61	36	48.1	+3.6	78	25	16	17	40	521	34	62	.53	−1.2	.33	4	0	T	.0	13.2	s.	36	se.	5	18	6	7	4.1	60
Bismarck [2]	1,677	5	41	955.6	1,016.6	−.3	61	31	46.0	+2.4	79	3	11	17	47	586	33	64	1.50	+.6	.91	6	0	T	.0	10.6	nw.	34	nw.	7	14	9	8	4.7	72
Devils Lake	1,478	11	44	961.7	1,015.9	+1.0	58	34	46.3	+3.9	74	3	11	17	37	582	33	60	1.68	+.4	1.42	4	0	.1	.0	9.1	nw.	27	s.	4	13	12	6	4.6	75
Williston	1,878	42	50	948.2	1,015.9	−.4	61	32	46.6	+3.2	81	3	13	17	45	570	29	53	.19	−.7	.19	1	0	T	.0	6.6	n.	33	nw.	15	13	7	11	5.1	80
UPPER MISSISSIPPI																																	4.2	
									52.3	−.5								70	1.58	[5]−.9															
Minneapolis-St. Paul [2]	919	43	74	983.1	1,016.9	+1.0	62	40	51.2	+2.3	75	28	22	17	34	428	37	63	.60	−1.5	.30	5	1	T	.0	11.2	se.	34	se.	6	18	7	6	3.6	72
La Crosse [2]	672	5	29	991.5	1,018.0	+1.4	62	37	49.2	+.1	71	26	20	17	34	487	38	70	.90	−1.4	.61	8	1	T	.0	9.2	se.	30	w.	9	16	8	7	4.2	68
Madison [2]	974	27	39	983.1	1,019.0	+1.4	60	36	48.2	−1.1	72	28	18	18	38	519	38	70	1.29	−1.1	.90	6	1	.0	.0	9.7	s.	33	w.	9	15	8	8	4.4	63
Charles City	1,015	10	51	981.7	1,019.0	+1.7	62	38	50.3	+1.7	73	26	23	17	34	455	----	--	2.14	−.2	1.74	5	1	.0	.0	6.0	se.	20	s.	15	20	6	5	3.1	--
Moline [2]	606	6	50	996.6	1,019.0	+1.4	63	39	51.1	−.9	75	1	23	18	38	431	40	70	1.81	−.6	1.59	5	3	.0	.0	7.5	se.	27	se.	7	17	4	10	4.3	64
Des Moines [4]	860	5	99	983.4	1,018.6	+1.7	66	41	53.2	−.2	76	26	27	17	42	366	38	68	1.55	−1.0	.78	5	2	.0	.0	8.5	se.	26	n.	16	14	8	9	4.3	--
Dubuque	699	60	79	992.9	1,018.3	+.7	63	40	51.4	−.5	73	26	27	17	37	423	40	74	2.32	−.2	1.90	6	1	.0	.0	5.1	s.	18	se.	6	17	6	8	4.1	--
Burlington [2]	702	4	36	993.2	1,019.0	+1.4	64	40	51.8	−2.0	78	1	23	18	39	406	41	78	2.05	−.6	1.21	4	2	.0	.0	8.6	s.	28	sw.	18	16	6	9	4.4	--
Cairo	357	5	99	1,006.1	1,019.0	+1.0	69	48	58.4	−2.1	80	13	33	18	33	207	----	--	1.59	−1.2	.60	8	1	.0	.0	6.8	ne.	26	sw.	7	18	8	5	3.7	81
Peoria [2]	609	7	26	996.6	1,019.3	+1.0	63	41	52.2	−1.3	80	1	22	18	33	398	40	69	1.18	−1.1	.98	6	0	.0	.0	7.9	s.	25	sw.	7	15	6	10	4.8	65
Springfield, Ill. [4]	636	5	191	996.6	1,020.0	+2.0	65	42	53.6	.0	80	1	24	18	34	353	42	70	1.27	−1.3	.41	8	1	.0	.0	9.5	s.	31	w.	7	13	9	9	4.7	58
St. Louis [4]	568	33	59	998.6	1,019.3	+1.3	67	48	57.4	−1.5	81	1	33	18	29	243	44	66	2.25	−.5	.62	9	2	.0	.0	9.4	s.	29	s.	6	15	10	6	4.2	72
MISSOURI VALLEY																																	3.9	
									53.8	+.1								66	1.74	−.4															
Columbia, Mo. [4]	784	6	66	989.8	1,018.6	+.6	69	43	56.0	−.9	82	1	28	18	35	279	42	72	3.23	+.6	1.20	6	5	.0	.0	6.2	e.	21	nw.	17	16	9	6	3.6	--
Kansas City [2]	963	38	76	990.9	1,018.3	+.7	70	45	57.3	−.4	80	1	32	18	38	238	40	61	1.89	−.8	.94	5	3	.0	.0	8.4	sw.	34	w.	6	16	7	8	4.1	--
St. Joseph [2]	967	5	51	988.5	1,018.3	+1.0	70	40	55.0	−1.0	78	15	27	18	43	310	40	69	2.06	−.8	1.07	5	5	.0	.0	6.8	s.	29	nw.	15	19	5	7	3.7	--
Springfield, Mo. [2]	1,324	5	50	973.2	1,019.0	+1.0	69	44	56.6	−1.0	80	15	25	18	38	262	42	68	2.52	−.5	1.46	5	5	.0	.0	10.5	se.	29	nw.	17	13	7	11	4.8	--
Topeka [4]	987	65	87	982.4	1,018.6	+1.3	71	44	57.6	+.6	81	5	32	24	41	232	39	68	1.77	−.6	.93	5	5	.0	.0	8.0	s.	24	w.	7	17	5	9	4.0	--
Lincoln [4]	1,189	6	81	974.6	1,018.0	+1.4	67	41	54.3	+.1	80	15	26	17	38	333	37	66	.97	−.9	.51	4	1	.0	.0	8.4	s.	31	w.	7	19	5	7	3.4	--
Norfolk, Neb. [2]	1,551	5	38	961.7	1,018.0	----	65	38	51.6	−.1	79	25	23	17	42	415	35	63	1.51	.0	1.03	5	2	.0	.0	----	nw.	--	----	--	19	5	7	3.4	--
Omaha [2]	1,105	5	68	982.1	1,018.0	+.7	67	41	54.0	+.6	77	20	28	17	41	342	39	66	1.67	−.5	.97	3	1	.0	.0	9.9	s.	33	n.	15	17	8	6	3.9	--
Valentine	2,598	46	54	925.2	1,017.6	+.3	65	34	49.4	+.1	83	24	19	17	45	484	31	57	.41	−.7	.35	4	1	T	.0	8.6	w.	34	nw.	7	19	7	5	3.5	--
Sioux City [2]	1,138	5	40	977.3	1,018.0	+1.1	66	37	51.4	+1.7	77	15	22	17	48	420	36	66	2.10	+.3	1.13	5	1	T	.0	9.4	nw.	31	nw.	15	15	10	6	3.8	--
Huron [2]	1,301	5	41	969.9	1,017.3	.0	63	34	48.8	+1.1	78	24	15	17	43	504	34	70	1.03	−.2	.57	6	2	.0	.0	12.1	nw.	38	se.	5	14	12	5	4.4	--

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS, OCTOBER 1948—Continued

District and station	Elevation of instruments: Barometer above sea level [1]	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Averages: Mean maximum	Mean minimum	Mean	Departure from normal	Temperature of the air: Extremes: Highest	Date	Lowest	Date	Greatest daily range	Total heating degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Departure from normal	Greatest in 24 hours	Days with 0.01 inch or more	Days with thunderstorms	Total snowfall (unmelted)	Snow, sleet, and ice on ground at end of month	Wind: Average hourly speed	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Character of day (sunrise to sunset), number of days: Clear	Partly cloudy	Cloudy	Average cloudiness, tenths (sunrise to sunset)	Possible sunshine
NORTHERN SLOPE	Ft.	Ft.	Ft.	Mb.	Mb.	Mb.	°F.	°F.	°F.	°F.	°F.		°F.		°F.		°F.		%	In.	In.	In.			In.	In.	M. p. h.					0-3	4-7	8-10	0-10	%
									47.3	+2.0									54	.36	−.5														4.3	--
Billings [2]	3,570	16	39	892.7	1,016.9	−2.1	65	36	50.8	+2.8	84	3	20	17	40	445	26	39	.02	------	.02	1	0	T	.0	10.4	sw.	34	nw.	15	17	6	8	4.3	84
Butte	5,533	44	58	831.7	1,021.0	-----	59	24	41.6	+.1	73	13	14	17	50	725	27	66	.35	−.4	.24	5	1	2.0	2	0...	s.	---	------	--	13	9	9	4.4	--
Glasgow	2,086	34	53	941.4	1,016.6	-----	66	30	48.0	+3.4	83	3	14	17	50	524	27	47	.02	−.8	.01	2	0	T	.0	----	nw.	---	------	--	12	9	10	4.8	--
Great Falls [2]	3,657	16	75	889.3	1,016.3	-----	63	38	50.6	+3.4	77	3	24	16	41	445	30	47	.08	−.8	.08	1	0	T	.0	14.5	sw.	44	sw.	7	17	5	9	4.4	81
Havre	2,507	11	67	927.2	1,016.9	+.3	65	30	47.4	+2.9	79	4	21	30	46	547	26	47	.09	−.6	.09	2	0	T	.0	7.5	w.	29	w.	4	15	7	9	4.5	83
Helena [2]	4,124	5	43	875.7	1,019.3	+1.3	61	28	44.1	+.3	73	11	15	17	36	646	30	62	.05	−.6	.05	1	0	.5	.0	6.3	w.	39	w.	4	16	7	8	4.2	77
Missoula [2]	3,263	4	32	904.2	1,020.0	+1.4	59	28	43.6	+.3	75	3	17	17	44	667	32	68	.23	−.7	.15	4	0	.3	.0	4.3	se.	33	nw.	24	11	6	14	5.1	62
Kalispell	2,973	48	58	914.0	1,018.3	+.7	55	31	43.1	−.4	69	13	20	17	34	682	33	69	.40	−.7	.27	4	1	T	.0	4.8	nw.	20	w.	5	11	6	14	5.4	61
Miles City [2]	2,371	5	28	932.6	1,017.3	−1.3	66	33	49.7	-----	86	3	18	17	46	478	28	46	T	------	T	0	0	T	.0	----	nw.	---	------	--	10	9	6	4.2	--
Rapid City [2]	3,259	5	56	904.2	1,017.3	−.7	65	36	50.6	+3.0	83	3	17	17	42	448	28	48	1.70	+.8	1.42	3	0	T	.0	14.2	nw.	54	nw.	15	18	7	6	3.8	--
Cheyenne [2]	6,094	22	40	814.8	1,017.3	+.7	61	32	46.3	+1.5	79	3	6	17	44	579	26	50	.53	−.4	.35	4	1	3.6	.0	9.9	w.	35	nw.	15	17	8	6	3.8	--
Lander [2]	5,352	6	30	831.0	1,018.0	.0	60	33	46.6	+3.1	78	3	14	17	41	569	30	56	.83	−.5	.74	2	1	3.0	.0	6.4	sw.	30	w.	5	13	13	5	4.0	--
Sheridan [2]	3,790	5	38	880.1	1,018.0	.0	67	31	49.2	+4.6	85	3	16	17	51	494	28	52	.36	−.7	.23	2	0	T	.0	6.9	nw.	34	nw.	6	12	14	5	4.3	--
North Platte [1]	2,821	11	51	917.7	1,017.3	.0	68	33	50.2	+.5	81	25	15	17	53	456	32	60	.36	−.7	.28	3	1	T	.0	10.3	w.	45	nw.	7	19	5	7	3.5	--
MIDDLE SLOPE																																				
									57	.5+. 9									51	.51	−1.5														3.	6
Denver [4]	5,292	106	113	838.5	1,016.9	+.3	66	40	53.0	+1.8	82	3	22	17	41	378	24	42	.06	−1.0	.04	2	1	T	.0	7.1	s.	26	ne.	15	18	6	7	3.8	--
Pueblo [2]	4,690	5	36	854.7	1,016.9	+1.0	71	33	52.4	+1.2	87	3	22	7	51	392	26	44	.01	−.6	.01	1	0	.1	.0	6.6	nw.	33	nw.	15	18	5	8	3.9	--
Concordia	1,392	50	58	968.5	1,019.0	+1.4	70	42	55.8	−.1	81	5	28	17	39	288	36	51	1.32	−.7	.74	5	3	.0	.0	7.8	s.	27	s.	5	20	4	7	3.1	76
Dodge City [2]	2,509	5	58	929.2	1,016.6	−.7	72	43	57.4	+1.3	90	4	28	17	44	253	36	52	.32	−1.0	.19	3	2	.0	.0	14.9	se.	43	s.	5	17	10	4	3.5	--
Wichita [2]	1,358	52	64	967.8	1,017.6	+1.0	72	46	59.4	+.8	82	5	33	18	36	185	38	52	.67	−1.9	.33	6	5	.0	.0	13.0	s.	44	s.	5	18	6	7	3.7	--
Oklahoma City [4]	1,214	10	47	974.6	1,018.0	+.7	76	50	63.0	+1.5	89	13	34	18	36	114	41	52	.54	−2.3	.53	4	2	.0	.0	8.0	s.	24	s.	6	20	5	6	3.1	77
Tulsa [2]	674	10	60	993.6	1,018.0	-----	76	46	61.2	−.4	88	15	29	18	40	150	44	62	.66	−2.7	.42	4	3	.0	.0	9.4	s.	43	nw.	7	17	5	9	4.1	68
SOUTHERN SLOPE																																				
									62.9	−.5									58	1.76	−.3														4.	8
Abilene [2]	1,755	4	59	956.3	1,016.9	+.3	76	52	64.2	−.1	91	15	32	18	35	100	46	57	2.21	−.3	1.41	5	2	.0	.0	11.6	s.	34	s.	5	10	7	14	5.7	66
Amarillo [2]	3,604	5	42	891.3	1,016.6	.0	74	44	58.5	+2.7	88	15	28	18	40	221	38	55	2.58	+.9	3.45	5	3	.0	.0	13.4	sw.	36	sw.	5	13	11	7	4.3	69
Del Rio	960	63	71	982.7	1,015.9	+.7	78	60	69.2	−.8	94	6	48	19	33	37	56	68	1.56	−.3	1.00	4	2	.0	.0	7.3	se.	26	n.	16	13	6	12	5.4	49
Roswell	3,614	6	29	893.3	1,016.3	+.7	75	43	59.0	−.5	89	15	32	26	44	209	37	52	.71	−.7	.31	7	4	.0	.0	7.0	s.	36	w.	31	10	16	5	4.6	65
Wichita Falls	1,030	4	49	981.0	1,017.6	-----	77	51	63.8	−3.7	91	15	35	18	37	104	45	57	1.75	−1.1	1.28	7	3	.0	.0	----	------	---	------	--	15	8	8	4.2	--
SOUTHERN PLATEAU																																				
									65.1	+2.1									46	.87	+.1														4.1	
El Paso [2]	3,916	35	85	887.6	1,014.2	+.3	76	53	64.4	+2.4	88	14	40	25	33	102	42	48	.18	−.6	.08	4	3	.0	.0	9.5	se.	40	se.	14	11	14	6	4.9	71
Albuquerque [2]	5,314	5	45	839.8	1,015.2	+.3	71	44	57.2	+.6	82	14	34	17	36	245	34	50	.60	−.2	.28	6	4	.0	.0	8.0	se.	42	s.	14	14	8	9	4.5	67
Flagstaff	6,907	34	48	792.4	1,018.0	+4.8	64	33	48.6	+1.7	76	8	25	26	42	508	31	55	1.87	+.4	.68	7	3	T	.0	----	nw.	---	------	--	14	7	10	4.6	--
Phoenix [4]	1,107	39	87	973.2	1,011.9	.0	88	62	74.6	+4.0	100	8	44	31	40	14	45	42	.96	+.5	.75	3	2	.0	.0	6.4	e.	24	e.	17	17	8	6	3.8	84
Tucson [2]	2,555	5	39	924.8	1,011.9	−.3	84	58	71.1	+2.4	95	3	43	31	39	23	44	40	.56	.0	.46	4	2	.0	.0	9.2	se.	43	se.	17	18	11	2	3.4	89
Yuma	142	9	54	1,003.4	1,010.5	−1.0	89	60	74.7	+1.4	105	3	45	31	39	7	49	42	1.07	+.8	1.03	3	2	.0	.0	4.9	sw.	24	n.	17	20	7	4	3.2	89
MIDDLE PLATEAU																																				
									50.7	+2.3									49	.53	−.3														4.1	
Ely [2]	6,262	8	41	810.7	1,018.0	-----	63	26	44.9	+3.1	76	2	10	28	48	628	25	46	.47	−.3	.34	3	2	.0	.0	11.1	s.	36	se.	3	13	11	7	4.4	84
Reno [2]	4,527	20	52	863.2	1,016.6	.0	71	31	50.8	+2.3	86	1	14	28	53	438	32	54	.17	−.2	.15	2	1	T	.0	6.1	s.	40	sw.	3	16	6	9	4.4	80
Winnemucca	4,339	5	56	868.9	1,016.9	−1.1	70	32	50.5	+2.2	84	2	17	28	52	454	29	48	.57	.0	.52	4	1	.0	.0	7.1	ne.	25	sw.	13	18	5	8	3.9	69
Modena	5,473	10	46	----	------	---	--	--	--	--	--	--	--	--	--	--	--	--	--	------	--	--	--	--	--	----	------	---	------	--	--	--	--	--	--
Salt Lake City [2]	4,357	32	58	868.9	1,016.9	+.3	66	40	53.1	+2.3	84	2	28	17	37	380	34	54	.87	−.4	.35	6	2	T	.0	8.3	se.	26	se.	3	15	7	9	4.3	72
Grand Junction [2]	4,602	5	26	861.8	1,017.6	+2.0	69	39	54.3	+1.5	83	14	29	17	38	337	28	42	.57	−.4	.53	2	1	T	.0	8.3	e.	34	nw.	5	19	6	6	3.5	--
NORTHERN PLATEAU																																				
									48.9	−.3									63	.66	−.6														4.8	
Baker [4]	3,471	36	54	900.8	1,019.3	.0	63	33	47.6	+1.0	78	13	18	28	42	536	32	64	.32	−.6	.25	4	2	T	.0	5.8	se.	28	sw.	3	13	7	11	5.0	78
Meacham	4,056	7	28	878.4	1,019.6	-----	57	35	46.1	-----	73	23	24	27	36	587	35	69	2.13	------	.85	8	1	.4	.0	----	se.	---	------	--	14	2	5	5.3	--
Boise [2]	2,739	5	49	921.1	1,017.3	−1.0	66	38	52.3	+2.2	80	3	22	27	39	394	33	50	.68	−.6	.39	4	1	.0	.0	8.0	se.	34	nw.	4	16	7	8	4.4	72
Lewiston	1,436	4	23	966.5	1,018.3	-----	64	39	51.2	-----	78	3	25	28	34	425	38	65	.40	------	.28	5	1	.0	.0	----	e.	---	------	--	15	4	12	4.5	--
Pocatello [2]	4,478	5	31	865.2	1,019.0	+1.4	65	32	48.4	+1.9	80	2	18	17	46	518	30	53	.35	−1.3	.20	3	1	T	.0	6.8	sw.	30	nw.	5	15	7	9	4.4	75
Ellensburg [2]	1,735	5	58	956.0	1,019.0	-----	60	31	45.8	−2.4	71	12	18	28	41	597	36	71	.43	−.1	.26	4	0	.0	.0	----	nw.	---	------	--	14	9	8	4.9	--
Spokane [2]	1,929	6	51	948.9	1,018.6	+.6	59	35	47.3	−1.0	72	23	23	29	33	551	35	64	.66	−.5	.43	4	0	T	.0	5.7	ne.	26	sw.	7	11	11	9	5.3	58
Walla Walla	991	57	65	982.4	1,018.6	+1.0	63	42	52.3	−1.2	78	3	29	28	28	391	----	--	.66	−.9	.26	9	0	.0	.0	3.9	s.	22	sw.	24	14	6	11	4.7	68
Yakima [2]	1,076	4	54	979.3	1,018.6	+1.0	66	33	49.3	−2.4	76	13	20	28	44	482	36	65	.27	−.4	.13	4	0	.0	.0	----	w.	---	------	--	13	9	9	4.6	--

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS, OCTOBER 1948—Continued

District and station	Elevation of instruments: Barometer above sea level [1]	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Averages: Mean maximum	Mean minimum	Mean	Departure from normal	Extremes: Highest	Date	Lowest	Date	Greatest daily range	Total heating degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Departure from normal	Greatest in 24 hours	Days with 0.01 inch or more	Days with thunderstorms	Total snowfall (unmelted)	Snow, sleet, and ice on ground at end of month	Wind: Average hourly speed	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Character of day (sunrise to sunset), number of days: Clear	Partly cloudy	Cloudy	Average cloudiness, tenths (sunrise to sunset)	Possible sunshine
NORTH PACIFIC COAST	*Ft.*	*Ft.*	*Ft.*	*Mb.*	*Mb.*	*Mb.*	°F.	°F.	°F. 52.1	°F. +.6	°F.		°F.		°F.		°F.	% 77	*In.* 2.44	*In.* −.9	*In.*			*In.*	*In.*	*M. p. h.*					*0-3*	*4-7*	*8-10*	*0-10* 6.4	%
Kelso [2]	750	38	76				62	38	50.2		78	1	27	17	48	460	45	84	2.77		.82	14	0	.0	.0						6	5	20	7.2	
North Head	211	5	55	1,009.8	1,017.3	−.3	58	48	53.0	+.1	73	1	40	27	22	372	46	79	4.55	−.5	1.33	14	0	.0	.0	13.7	n.	46	s.	23	9	8	14	6.1	46
Seattle [4]	125	90	321	1,013.2	1,018.0	−.3	59	46	52.4	−1.3	72	2	36	27	27	390	45	83	2.31	−.5	.75	12	1	.0	.0	7.9	n.	41	s.	24	6	10	15	6.5	40
Tacoma	194	172	201	1,010.8	1,018.0	.0	58	44	51.0	+.5	71	2	33	27	30	434			3.00	−.3	.95	12	0	.0	.0	6.3	n.	38	sw.	24	6	9	16	6.4	36
Tatoosh Island	86	5	61	1,014.2	1,017.3	+.4	56	47	51.2	+1.3	65	22	42	29	16	431	46	84	4.98	−3.2	1.00	16	0	.0	.0	15.0	ne.	52	s.	6	8	7	16	6.4	42
Burns	4,162	35	47	874.7	1,018.0		64	31	47.4	+1.4	78	12	13	28	44	546	31	54	.03	−.6	.02	2	1	T	.0		n.			14	7	10	4.9	
Eugene [2]	433	4	35	1,004.4	1,018.3		62	40	51.2		73	10	26	27	28	428	46	86	2.06		.80	12	0	.0	.0		n.				4	11	16	6.8	
Medford [2]	1,329	29	58	969.9	1,017.6	.0	69	39	54.0	+.4	85	1	25	28	46	342	43	73	1.27	−.1	.50	7	0	.0	.0		s.				8	10	13	6.1	
Portland, Oreg. [4]	154	68	106	1,012.5	1,018.0	.0	63	48	55.2	+1.0	75	1	38	27	23	307	45	76	2.42	−.7	.65	11	0	.0	.0	5.6	nw.	19	e.	1	8	10	13	6.1	44
Roseburg	510	45	76	999.3	1,018.3	.0	65	45	55.0	+1.1	78	17	31	27	38	313			.97	−1.6	.41	7	0	.0	.0	3.3	n.	18	n.	7	3	7	21	7.4	32
MIDDLE PACIFIC COAST									60.6	+.2								68	1.37	−.5													4.8	
Eureka	60	72	88	1,015.9	1,018.3	.0	60	48	53.6	.0	73	2	40	30	23	354	50	85	3.33	+1.0	1.42	9	0	.0	.0	6.5	n.	27	ne.	11	8	7	16	6.2	42
Red Bluff [2]	353	5	26	1,002.0	1,014.6		78	52	65.0	+.7	90	7	34	30	37	66	41	47	.51	−.8	.22	6	0	.0	.0	7.0	nw.	26	se.	3	17	6	8	4.3	79
Sacramento [4]	66	92	115	1,012.2	1,014.6	−.6	75	51	63.2	+.3	88	8	39	30	34	89	47	64	1.45	+.5	1.44	2	0	.0	.0	5.7	s.	17	sw.	18	17	11	3	3.6	77
San Francisco [4]	155	112	132	1,010.2	1,015.9	.0	68	53	60.4	−.1	84	17	47	30	33	158	51	78	.20	−.9	.15	4	0	.0	.0	7.4	w.	28	w.	29	11	12	8	4.9	62
SOUTH PACIFIC COAST									65.1	+1.2								68	.50	−.1													5.1	
Fresno [2]	327	5	34	1,002.4	1,014.6	−.6	81	49	65.0	+2.7	95	8	38	30	43	64	48	58	.08	−.5	.08	1	1	.0	.0	4.3	nw.	20	nw.	4	17	8	6	3.7	90
Los Angeles	338	236	263				76	56	66.3	+1.0	96	7	48	31	38	38			.09	−.6	.09	2	0	.0	.0	5.5	w.	20	w.	30	9	12	10	5.4	60
San Diego [2]	87	20	55	1,011.2	1,014.2	.0	71	57	64.1	.0	86	7	47	31	32	50	56	77	1.32	+.8	1.14	3	1	.0	.0	6.1	nw.	18	sw.	17	4	15	12	6.2	45
ALASKA																																				
Anchorage [2]	132	6	44	989.5	994.2		42	29	35.8	−.2	53	4	21	31	29	907	31	79	1.75	−.4	.75	14	0	7.8	T	5.7	n.	43	se.	28	0	3	28	8.9	
Annette Island	113	5	53	1,007.5	1,011.5		50	41	49.6	+2.0	56	1	34	31	19	614	42	86	19.70	+4.2	3.04	25	0	T	.0		se.			0	8	23	8.5	
Barrow	20	5	27	1,004.1	1,004.1		16	5	10.6	−6.0	29	1	−14	20	26	1,698	8	88	.52	.0	.14	15	0	5.4	8.0	15.1	se.	40	nw.	25	0	9	22	8.2	
Bethel [2]	28	5	31	993.2	994.6		34	23	28.6	−2.8	44	1	6	25	19	1,124	26	85	1.20	−.5	.32	15	0	9.4	1.8	10.9	n.	40		7	2	4	25	8.5	
Cordova [2]	45	5	32	994.8	996.6		44	34	39.4	−1.2	50	8	27	6	23	794	36	90	24.07	+10.6	3.14	29	1	1.4	T		e.			0	0	31	9.2	
Fairbanks [2]	455	5	63	980.0	997.3		33	18	25.2	−1.4	52	1	1	20	32	1,238	23	84	.42	−.4	.09	13	0	5.9	2.0	4.9	n.	17	e.	3	0	4	27	8.6	
Galena	139	4	66	991.5	996.3		29	17	23.0	−3.3	45	2	−2	24	22	1,305	18	75	.48	−.2	.18	8	0	7.0	5.0		n.	35	e.	31	3	11	17	7.1	
Gambell	32	5	32	998.0	999.0		32	26	28.8	−2.1	41	1	13	30	13	1,122	24	82	.34	−1.0		7		1.3	.0	19.0	ne.	44	ne.	30	0	1	30	9.0	
Juneau [2]	80	6	30	1,006.1	1,006.8		46	38	42.0	+.7	53	2	26	7	18	714	38	84	11.04	+2.7	1.62	30	0	.0	.0	12.6	se.	45	se.	13	0	2	29	9.0	
Kotzebue [2]	20	5	31	998.6	999.0		27	18	22.9	−1.8	39	1	0	26	17	1,308	22	86	.50	−.1	.24	10	0	3.3	3.0	11.6	ne.	37	se.	31	6	5	20	7.1	
McGrath [2]	341	5	31	983.7	994.9		30	16	23.1	−4.3	45	1	−12	25	29	1,300	20	80	.65	−1.3	.23	8	0	10.1	7.5		nw.	18	s.	30	2	5	24	8.0	
Nome [2]	22	10	75	997.0	997.6		32	19	25.8	−3.6	44	12	4	27	26	1,219	23	82	1.08	−.5	.61	9	0	9.9	.9	12.6	n.	47	e.	30	6	8	17	6.5	
Northway [2]	1,718	5	32	953.0	998.6		34	14	23.8	−1.8	53	2	−4	25	30	1,278	20	79	.17	−.3	.06	6	0	4.1	2.7		nw.				2	8	21	7.8	
HAWAII																																				
Honolulu [4]	38	86	98	1,015.6	1,016.9	+1.3	81	73	76.9	+.1	84	15	70	22	12	0	65	66	1.12	−.4	.23	13	0	.0	.0	11.2	ne.	27	se.	28	5	20	6	5.9	70

[1] Height of barometer cistern above mean sea level on January 1, 1900, or when station was first established since January 1, 1900. When station is moved to new location or airport, the pressure is reduced to the original elevation for homogeneity. These elevations do not represent the present station elevation in most cases.

[2] Data are from airport records. Pressures adjusted to original elevations according to note [1].

[3] Barometric, hygrometric, wind, character of day, and average cloudiness data from airport records; remainder from city office records.

[4] Barometric and hygrometric data from airport records; remainder from city office records.

[5] Barometric, temperature, degree day, and hygrometric data from airport; remainder from city office records.

NOTE.—Unless otherwise indicated, data in table are city office records.

SEVERE LOCAL STORMS FOR OCTOBER 1948

[The table hereunder contains such data as have been received concerning severe local storms that occurred during the month. A revised list will appear in the United States Meteorological Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Pompano, Florida	5	Late afternoon or early evening.		0	$100,000	Tornado	25 houses demolished; 7 persons injured.
Opa-Locka (15 miles northwest of Miami), Fla.	5	do		0	15,000	do	3 houses destroyed.
Ft. Lauderdale (4 miles west), Fla.	5	do		0		do	Minor damage. 3 tornadoes on advance edge of hurricane. A characteristic tornado dip and recovery in pressure on all barograph traces from Keys to Hillsboro Lighthouse. Possibly same tornado, which dipped to earth at the several places above as it progressed northeastward in advance of hurricane vortex.
Eastern Wisconsin (Manitowoc to Kenosha).	7	Early a. m.			21,000	Wind	3 small boats beached in Milwaukee and 1 small yacht sunk; estimated loss, $5,000. Power poles, wires, and trees blown down in Milwaukee; estimated loss, $1,000. 7 small boats destroyed in Racine and 3 others badly damaged; estimated loss, $15,000.
Lake County, Ill.	7	7 a. m.				do	50 m. p. h. winds felled several trees and caused electric power interruptions. Several pleasure boats in Waukegan and Great Lakes harbors damaged.
New London, Conn.	11	Night			7,000	Rain	Catch basins clogged and streets in business section flooded, overflowing into stores and residences.
Cameron, W. Va.	12	Evening			1,000	Electrical	Several electrical transformers damaged and wiring in more than a score of homes burned out.
Bristow (5 miles southeast), Creek County, Okla.	13			1		do	Man killed by lightning as he was putting a tarpaulin over hay.
Faribault, vicinity of, Minn.	15	5—10 p. m.			10,000	do	Barn destroyed by fire after being struck by lightning.
Orleans Parish, La.	18	Late afternoon			2,000	Thundersquall	Thundersquall, attending passage of cold front, resulted in loss of one 27-foot sloop and endangered several others on Lake Pontchartrain. Winds of 35 m. p. h. recorded by Weather Bureau, sufficient to raise very high waves on the lake. 13 persons rescued by Coast Guard from small craft on lakes in Orleans Parish.
Casa Grande (near), Ariz.	18	Evening			4,000	Thunderstorm and wind.	Heavy rain, accompanying a thunderstorm, caused flash flood which came down a draw and flooded Dutch Miller cottage camp 18 miles west of Casa Grande, overturning 15 cabins and injuring 3 persons. High winds destroyed 2 buildings on Kortson Ranch near Casa Grande.
Winslow, Ariz.	19	5:05—5:15 p. m.				Tornado cloud	Tornado funnel descended from dark cumulus cloud in a well-formed cone. Soon afterwards it was joined by a second very ragged cone. Both cones disappeared, without having reached ground. A noise like rustling of cloth was heard during life of larger cone.
Upper and central Puget Sound area, Wash.	24	Midnight to 10 a. m.			6,000	Wind	Persistent high winds, accompanying an ocean disturbance, reached high velocities shortly after midnight with maximum of 41 m. p. h. and extreme of 43 m. p. h. at 6:22 a. m. at Weather Bureau Office, Seattle. Velocities remained high for several hours, being above 30 m. p. h. until about 10 a. m. Damage largely to power and telephone lines and a small amount to shipping that became unmoored; trees uprooted. Area affected extended from Seattle and Tacoma northward to near the Canadian border, but was all in the near vicinity of Puget Sound or the extreme eastern part of the Straits of Juan de Fuca.
Nantucket, Marthas Vineyard and Cape Cod, Mass., southern Rhode Island.	24–25	5 a. m., 24th to 11 p. m., 25th.				Gales and rain	Northeast storm of unusually long duration, accompanied by winds of gale force and resulting high seas, caused moderate damage to small craft and shore property, and electric power failures in southeastern Massachusetts and the Narragansett area of Rhode Island. Heavy rain interrupted traffic and caused numerous highway accidents throughout eastern Massachusetts.
Kurtistown (near), Hawaii	25				500	Wind	Described by press as "vest-pocket twister."
Hiawatha, Brown County, Kans.	29	10 p. m.	220	0	5,000	Tornado	Struck Hiawatha near location of standpipe and travelled northeastward for 1 mile, passing along eastern edge of town. Small buildings and power lines blown down and some larger buildings damaged.
Independence and vicinity, Montgomery County, Kans.	30	8:30 p. m.	[1] 2		2,500	Hail	Path 4 miles long.
Lamesa, Dawson County, Tex.	31	5:54 p. m.	880		180,150	Wind and hail	Unpicked cotton knocked out of bolls by high wind, heavy rain, and moderate hail. Most hailstones size of marbles; some 1 inch in diameter. About half of damage due to hail.
Elk City (1 mile east), Beckham County, Okla.	31				25,000	Electrical	Lightning struck a hay barn.

[1] Miles instead of yards.

SOLAR RADIATION DATA FOR OCTOBER 1948

[Solar Radiation Investigation Section, I. F. HAND in Charge]

Explanation of Tables 1 and 2 and references to descriptions of instruments, stations, and methods of observation, and to summaries of data, are given in the MONTHLY WEATHER REVIEW, vol. 72, No. 1, January 1944, p. 43. A list of pyrheliometric stations is given on page 45 of that issue. An explanation of the formula used in computing the air mass values for each station listed in Table 1 appears in vol. 75, No. 3, March 1947, p. 47.

TABLE 1.—*Solar radiation intensities during October 1948*

[Gram calories per minute per square centimeter of normal surface]

MADISON, WIS.

Date	Sun's zenith distance A.M. 78.7°	75.7°	70.7°	60.0°	0.0°	P.M. 60.0°	70.7°	75.7°	78.7°	Vapor pressure 7:30 a.m.[1]	1:30 p.m.[1]
	Air mass 4.81	3.84	2.88	1.92	*0.96	1.92	2.88	3.84	4.81		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1				0.96	1.27	1.02				12.3	12.7
2				1.30	1.49					7.2	6.6
4			0.91	1.11	1.40	1.08	0.90			6.4	7.4
9			.90	1.14						8.4	4.6
13				.87						6.1	9.8
14				1.11	1.32	1.03				7.8	9.4
15			.70	1.04	1.34					7.2	9.1
16				1.10	1.43					8.1	6.1
18						1.18				3.7	3.5
19			1.11	1.31	1.54	1.31				5.3	5.3
20			1.02	1.19	1.37					5.6	5.3
25			.59	.95	1.21					7.2	10.6
26			.74	1.04	1.38					7.8	9.8
Means			.85	1.09	1.38	1.12	(.90)				
Departures			−.16	−.09	−.04	−.07	−.12				

LINCOLN, NEBR.

	Air mass 4.77	3.81	2.86	1.91	*0.95	1.91	2.86	3.81	4.77		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1		0.60	0.73	0.92	1.19					10.2	9.8
4					1.16	0.92	0.73	0.56	0.45	8.4	9.4
8		.66	.83	1.20	1.41					9.4	8.7
11						1.09	.88	.75		6.1	8.4
12					1.40	1.19	1.03	.88	.77	6.6	10.6
13	0.72	.81	.98	1.11	1.37	1.14	1.01	.83	.79	7.2	9.1
14	.69	.77	.90	1.12	1.37	1.14	.99	.90	.82	6.4	9.1
18					1.35	1.25	1.10	.99	.90	3.2	4.6
19	.77	.88	1.03	1.22	1.38	1.25	1.10	.94	.84	4.6	5.3
20	.72	.83	.96	1.14	1.31	1.08	.82	.64	.52	5.1	9.1
21	.60	.71	.88	1.10	1.34	1.08	.86	.71	.58	5.6	6.6
25	.70	.83	.96	1.16	1.38	1.17	.97	.82	.69	5.8	6.6
26	.66	.77	.90	1.10	1.31	1.14	.90	.75	.62	6.1	8.7
27				1.01	1.25	1.03	.71	.54	.43	2.0	8.1
Means	0.69	0.76	0.91	1.11	1.30	1.12	0.92	0.78	0.67		
Departures	−.10	−.15	−.15	−.14	−.15	−.11	−.13	−.14	−.14		

TABLE MOUNTAIN, CALIF.

	Air mass 3.76	3.01	2.26	1.51	*0.75	1.51	2.26	3.01	3.76		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1				1.39							
6				1.43							
11				1.48							
14				1.49							
16	1.11	1.21	1.31	1.43							
20	1.10	1.18	1.29	1.43							
25				1.40							
27	1.16	1.25	1.35	1.47							
31				1.47							
Means	1.12	1.21	1.32	1.44							
Departures	−.03	−.03	−.02	−.01							

TABLE 1.—*Solar radiation intensities during October 1948*—Con.

[Gram calories per minute per square centimeter of normal surface]

CLIMAX, COLORADO

Date	Sun's zenith distance A.M. 78.7°	75.7°	70.7°	60.0°	0.0°	P.M. 60.0°	70.7°	75.7°	78.7°	Vapor pressure 7:30 a.m.[1]	1:30 p.m.[1]
	Air mass 3.24	2.59	1.94	1.29	*0.65	1.29	1.94	2.59	3.24		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
2				1.42							
3				1.46	1.50						
7						1.49	1.36				
8			1.42	1.51	1.58	1.49	1.30	1.20	1.19		
9					1.40						
10					1.54						
12			1.36	1.50	1.59	1.46	1.31	1.20	1.14		
13				1.47	1.54	1.44	1.28	1.14			
14			1.29	1.40			1.19	.96			
15				1.49							
17			1.45	1.56	1.61	1.52	1.39	1.30	1.24		
18					1.59		1.38				
20			1.32	1.48	1.54	1.47	1.32	1.22			
21				1.56	1.60	1.50	1.42	1.32			
22				1.54	1.59	1.50	1.36	1.25			
25				1.53	1.50	1.48	1.37	1.25	1.16		
26				1.47		1.49	1.36	1.26	1.17		
29					1.51						
31			1.40	1.48	1.56	1.50					
Means			1.37	1.49	1.55	1.49	1.34	1.21	1.18		
Departures			−.01	+.06	.00	+.01	.00	−.03	+.01		

BOSTON, MASS.

	Air mass 4.96	3.96	2.97	1.98	*0.99	1.98	2.97	3.96	4.96		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1	0.86	1.02	1.16							18.3	17.7
19			1.09	1.08						4.8	5.3
22			.74	.62						4.6	6.4
28			.96	.74						7.2	8.4
Means	(.86)	(1.02)	.99	.81							
Departures	+.15	+.24	+.11	−.22							

BLUE HILL, MASS.

	Air mass 4.86	3.89	2.92	1.94	*0.97	1.94	2.92	3.89	4.86		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1								0.46	0.35	18.2	17.8
2	0.43	0.51	0.69	0.87						14.2	13.9
3									.91	7.0	7.8
4	.95	1.06					1.08	1.02	.90	4.8	5.6
7									.70	11.3	12.8
9						1.13	.99	.84	.78	14.4	9.3
15							1.04	.88	.81	7.8	7.2
16	.94	1.02	1.15	1.31			1.06	.89	.81	5.1	5.4
17				.91		.96				12.7	12.2
19	.97	1.06	1.15	1.19		1.24				4.5	3.5
21									.63	6.5	5.4
22	.87	.97	1.09	1.11		.87	.75	.64	.54	3.7	4.7
27	.83	.91	1.02	1.06		1.15	.90	.73	.63	4.6	7.6
28	.95	1.03	1.16	1.27		.82	.73	.69	.64	6.7	5.7
30	.70	.83	.95	1.16		1.12	.92	.78	.68	7.2	6.2
31	.59	.65	.79	.96			1.03	.85	.71	6.4	7.2
Means	.80	.89	1.00	1.09		1.04	.94	.78	.70		
Departures	−.05	−.06	−.08	−.13		−.16	−.08	−.12	.08		

( ) Interpolated.

*Extrapolated.

[1] 75th meridian time.

TABLE 2.—*Daily totals and weekly means of solar radiation (direct+diffuse) received on a horizontal surface during October 1948*

[Gram calories per square centimeter]

Date	Washington, D. C.	Madison, Wis.	Lincoln, Nebr.	New York, N. Y.	Fresno, Calif.	Fairbanks, Alaska	Columbia, Mo.	Boston, Mass.	Nashville, Tenn.	Twin Falls, Idaho	La Jolla, Calif.	Riverside, Calif.	Blue Hill, Mass.	Newport, R. I.	Salt Lake City, Utah	Put-in-Bay, Ohio	State College, Pa.	Davis, Calif.	Toronto, Canada	Ithaca, N. Y.	East Wareham, Mass.	Honolulu, T. H.	Pearl Harbor, T. H.	East Lansing, Mich.	Summit, Mont.	Soda Springs, Calif.	Grand Lake, Colo.
1948	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.
October 1	283	435	419	292	420	80	401	280	264	418	288	407	292	450	352	184	273	391	147	110	265	649	569	230	426	471	355
October 2	298	465	280	----	416	185	474	295	380	337	301	412	315	399	381	56	357	417	69	116	329	599	442	74	(385)	416	340
October 3	128	409	362	298	467	145	484	237	455	74	428	394	322	438	231	463	329	432	426	317	400	527	436	355	295	338	434
October 4	265	428	412	430	479	176	512	375	179	221	290	436	414	478	225	459	389	302	391	289	411	605	549	271	122	146	384
October 5	16	164	296	77	457	28	266	194	205	275	199	300	223	223	194	213	50	464	203	88	242	608	518	242	(159)	456	132
October 6	124	186	64	213	466	47	24	226	380	203	364	406	258	284	350	271	180	466	175	166	328	643	524	148	(226)	468	221
October 7	116	138	46	352	473	54	228	158	339	390	268	406	227	212	397	178	356	438	263	256	230	600	399	46	137	470	154
Means	176	318	268	277	454	102	341	252	314	274	305	394	293	355	304	261	276	415	239	192	315	604	491	195	250	395	296
Departures	−149	+33	−61	−23	+27	−12	−28	−22	−26	−80	−73	+3	−17	+48	−40	−72	−3	+18	−12	−84	+13	+12	−8	−68	-----	+7	----
October 8	37	71	434	68	467	44	421	15	351	388	392	416	59	136	407	162	36	432	25	47	156	648	548	147	(395)	470	464
October 9	320	404	430	284	446	73	478	290	456	376	308	349	345	390	345	326	202	431	183	229	327	624	480	250	392	468	434
October 10	343	430	163	268	450	29	52	281	177	373	403	----	319	359	373	208	86	422	350	154	328	651	533	309	(377)	458	427
October 11	26	206	417	79	223	157	450	111	325	372	199	395	131	165	382	166	191	70	54	129	167	611	464	52	359	301	206
October 12	253	284	413	165	440	100	450	214	404	359	348	294	204	330	388	229	252	369	204	216	315	550	496	163	356	381	481
October 13	243	385	407	271	427	108	396	291	441	347	423	334	310	332	367	97	101	374	148	22	329	645	533	39	343	116	470
October 14	200	387	401	261	436	74	443	111	414	132	417	397	133	160	205	407	253	392	310	92	130	633	538	192	263	53	365
Means	203	310	381	199	413	84	384	188	367	335	356	364	214	267	352	228	160	356	182	127	250	623	513	164	355	321	407
Departures	−99	+57	+72	−84	+19	−5	+10	−34	+68	−4	−26	−3	−95	−43	+24	−37	−88	−7	−10	−133	−32	+55	+42	−46	-----	−45	----
October 15	347	352	311	340	429	----	405	258	412	365	201	375	299	368	52	350	410	423	340	266	333	552	480	274	212	(437)	240
October 16	312	298	177	326	424	----	48	300	384	368	288	340	362	388	353	105	353	391	116	231	376	268	225	56	(325)	445	121
October 17	288	268	416	325	335	----	442	270	20	365	96	----	311	342	380	104	61	414	52	9	319	290	269	80	341	(435)	475
October 18	153	330	399	116	284	48	494	23	440	364	292	----	21	40	323	273	278	405	229	141	36	575	487	239	336	(427)	460
October 19	331	373	384	314	404	143	446	302	420	349	344	248	359	388	355	302	275	361	97	184	351	550	494	130	(316)	(420)	297
October 20	246	319	346	137	392	145	440	132	444	340	288	315	151	137	338	245	186	349	104	46	159	197	167	268	(316)	416	438
October 21	302	99	362	362	372	70	336	125	288	332	114	334	149	262	312	317	379	353	228	161	165	517	452	172	274	(411)	438
Means	283	291	342	274	377	101	373	202	344	355	232	322	236	275	302	242	278	385	167	148	248	421	368	174	303	427	352
Departures	−1	+59	+46	+9	+11	+28	+40	−33	+41	+45	−96	−24	−45	−7	−1	−4	+42	+35	+3	−87	−6	−77	−59	−30	-----	+39	----
October 22	72	95	353	254	382	61	417	250	251	327	182	330	289	348	334	192	221	292	243	216	327	420	317	135	306	347	421
October 23	42	262	373	144	400	39	417	135	268	324	165	353	123	134	340	54	122	376	62	103	150	612	546	111	286	329	421
October 24	224	305	367	49	387	20	415	21	373	287	172	359	3	38	350	118	296	380	68	171	32	576	490	64	74	407	420
October 25	144	279	346	93	385	63	408	18	341	329	136	343	19	46	298	356	342	387	170	60	35	573	514	206	98	395	410
October 26	321	296	339	288	371	44	392	97	350	279	178	342	74	74	320	330	348	380	225	163	68	540	489	223	112	392	399
October 27	285	255	326	317	401	----	181	272	167	195	90	35	292	324	94	314	303	384	109	55	303	406	355	204	(267)	406	236
October 28	175	238	185	214	391	15	361	226	320	277	159	146	270	334	45	276	241	364	114	157	315	576	492	185	225	382	137
Means	180	247	327	194	388	42	370	146	310	288	155	273	153	186	255	234	268	366	142	132	176	529	458	161	195	379	349
Departures	−76	+35	+49	−31	+41	−16	+69	−30	+60	+12	−146	−51	−62	−38	−30	+6	+54	+38	−4	−35	−25	+36	+23	−17	-----	−5	----
ACCUMULATED DEPARTURES ON OCTOBER 28, 1948																											
	−5999	+8092	+7035	−6944	+12152	----	----	−4543	----	−2170	−6202	----	−5432	+105	−840	----	−2345	−3430	+1771	−24444	−1365	----	----	−1729	-----	-----	----

TABLE 3.—*Daily totals and weekly means of solar and sky radiation plus the radiation reflected from the ground, as received on a vertical surface facing south at Blue Hill, Mass., during October 1948*

Date	1	2	3	4	5	6	7	Mean	8	9	10	11	12	13	14	Mean
Gm. cal/cm²	296	350	311	488	177	225	207	293	38	399	364	93	207	380	102	226
Date	15	16	17	18	19	20	21	Mean	22	23	24	25	26	27	28	Mean
Gm. cal/cm²	352	493	418	18	465	133	159	291	421	76	3	14	66	458	428	209

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, October 1948

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, October 1948

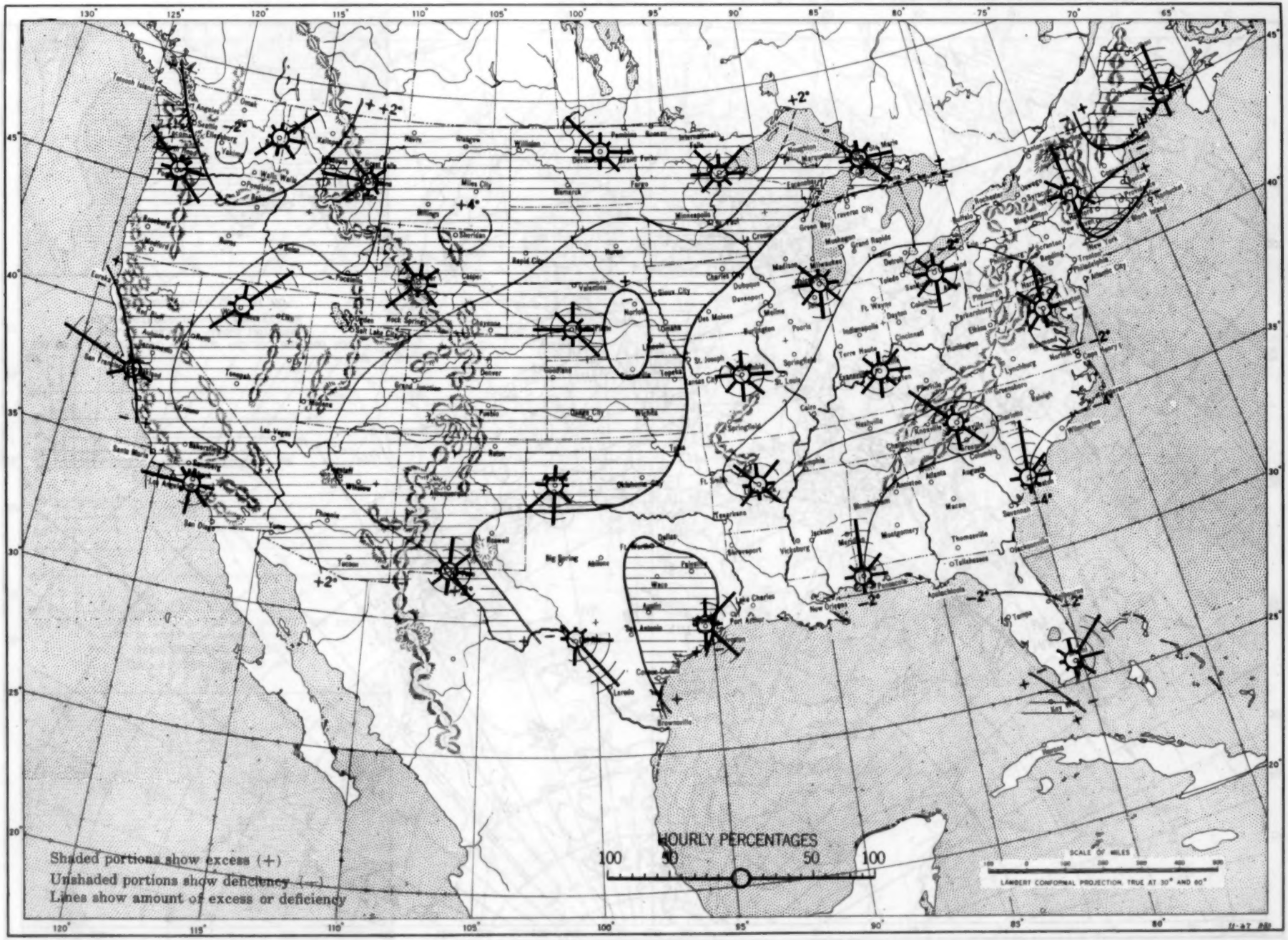
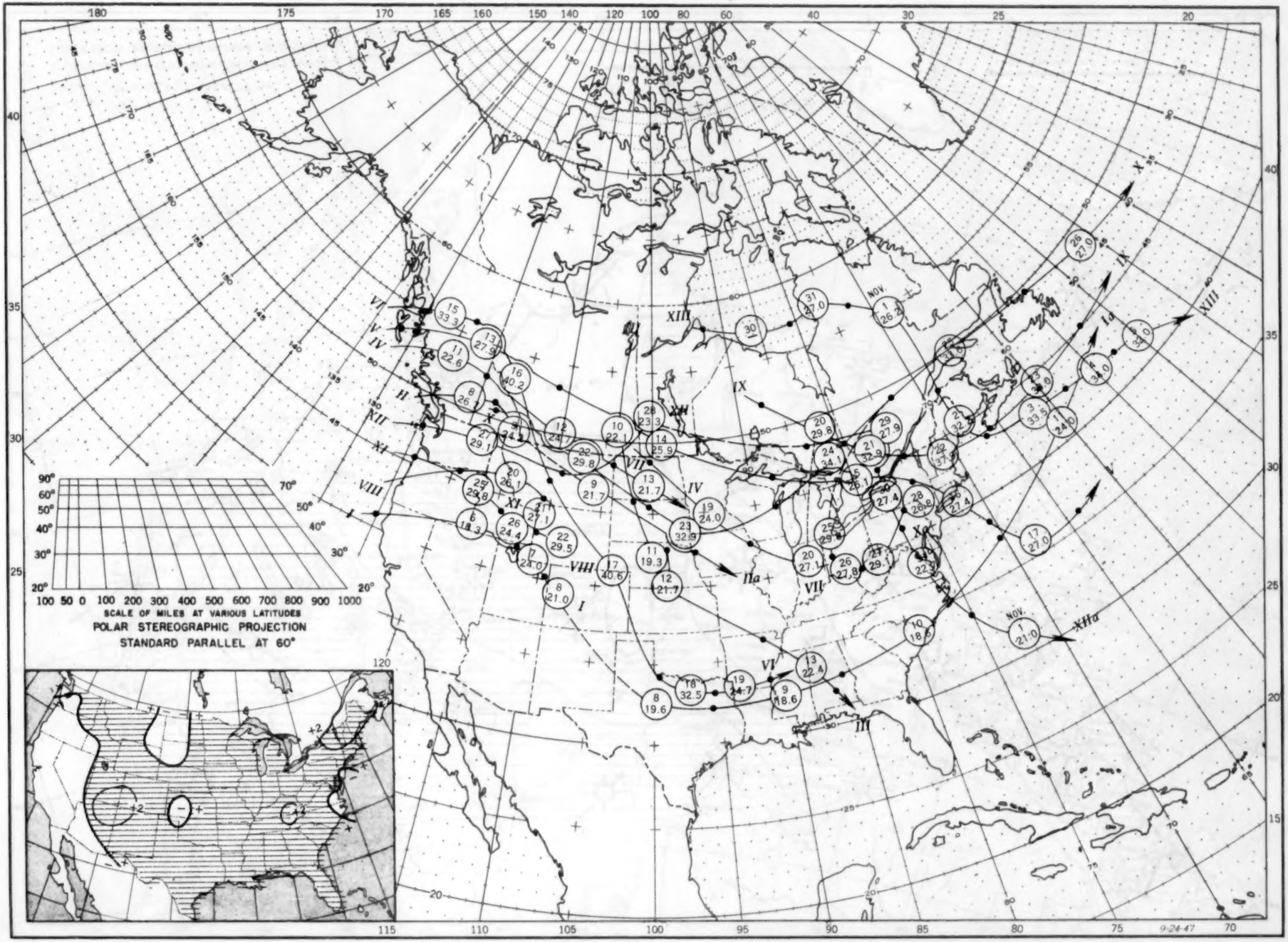
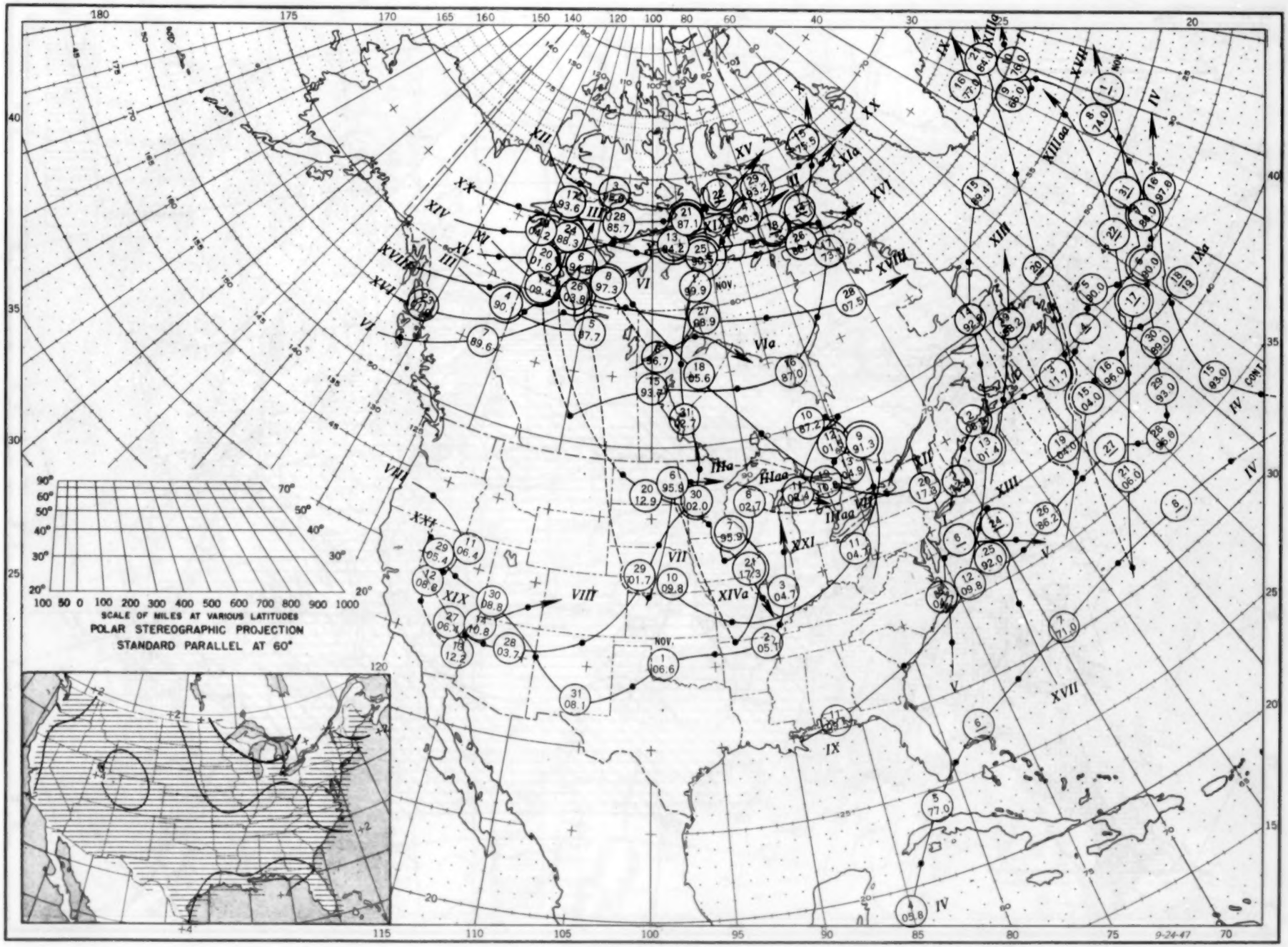

Shaded portions show excess (+)
Unshaded portions show deficiency (−)
Lines show amount of excess or deficiency
HOURLY PERCENTAGES
100 50 50 100
SCALE OF MILES
LAMBERT CONFORMAL PROJECTION TRUE AT 30° AND 60°

Chart II. Tracks of Centers of Anticyclones, October 1948. (Inset) Departure of Monthly Mean Pressure from Normal



Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

Chart III. Tracks of Centers of Cyclones, October 1948. (Inset) Change in Mean Pressure from Preceding Month



Circle indicates position of cyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of cyclone at 7:30 p. m. (75th meridian time)

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, October 1948

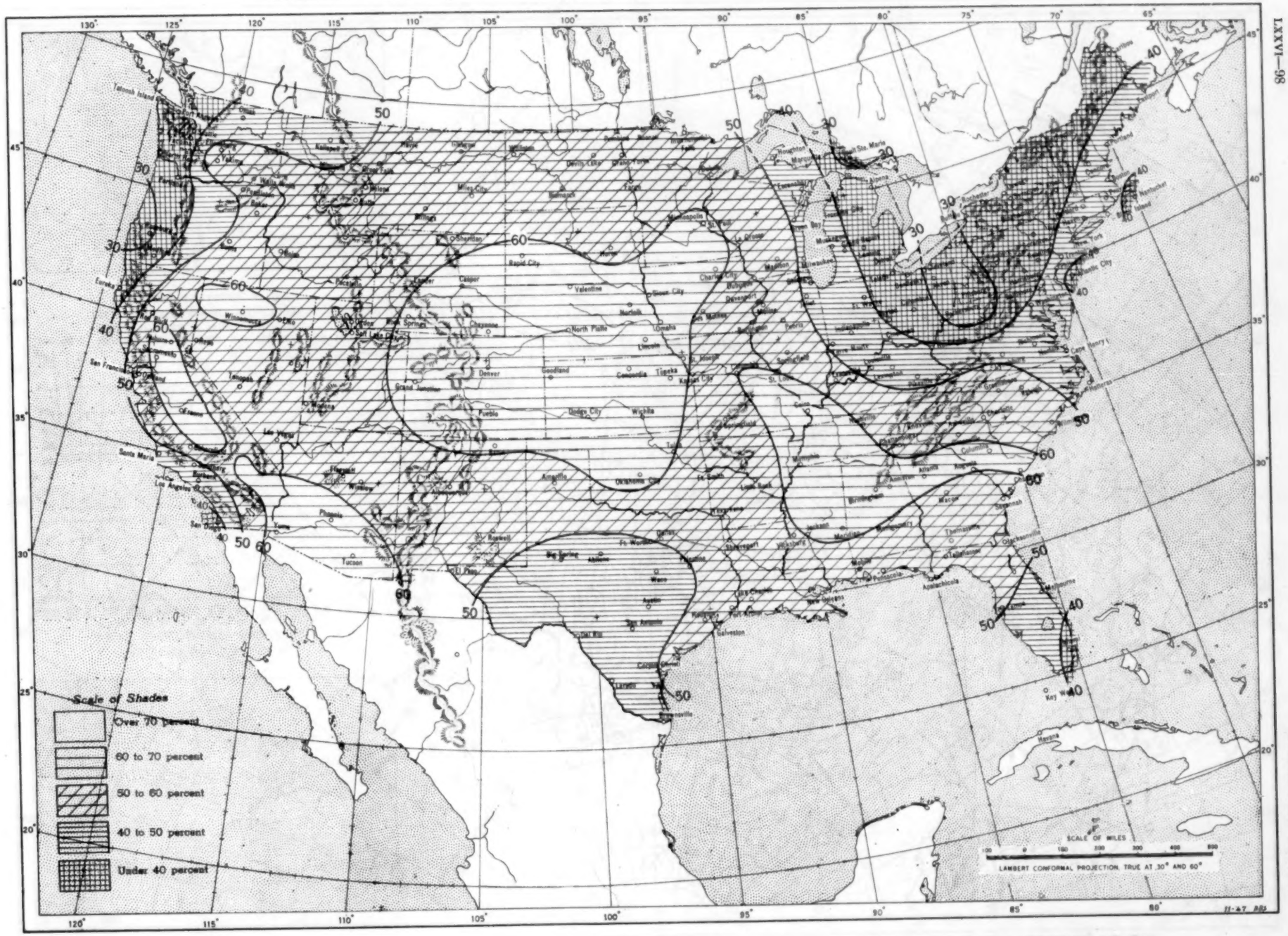

Scale of Shades
Over 70 percent
60 to 70 percent
50 to 60 percent
40 to 50 percent
Under 40 percent
SCALE OF MILES
LAMBERT CONFORMAL PROJECTION, TRUE AT 30° AND 60°

Chart V. Total Precipitation, Inches, October 1948. (Inset) Departure of Precipitation from Normal

Chart V. Total Precipitation, Inches, October 1948. (Inset) Departure of Precipitation from Normal

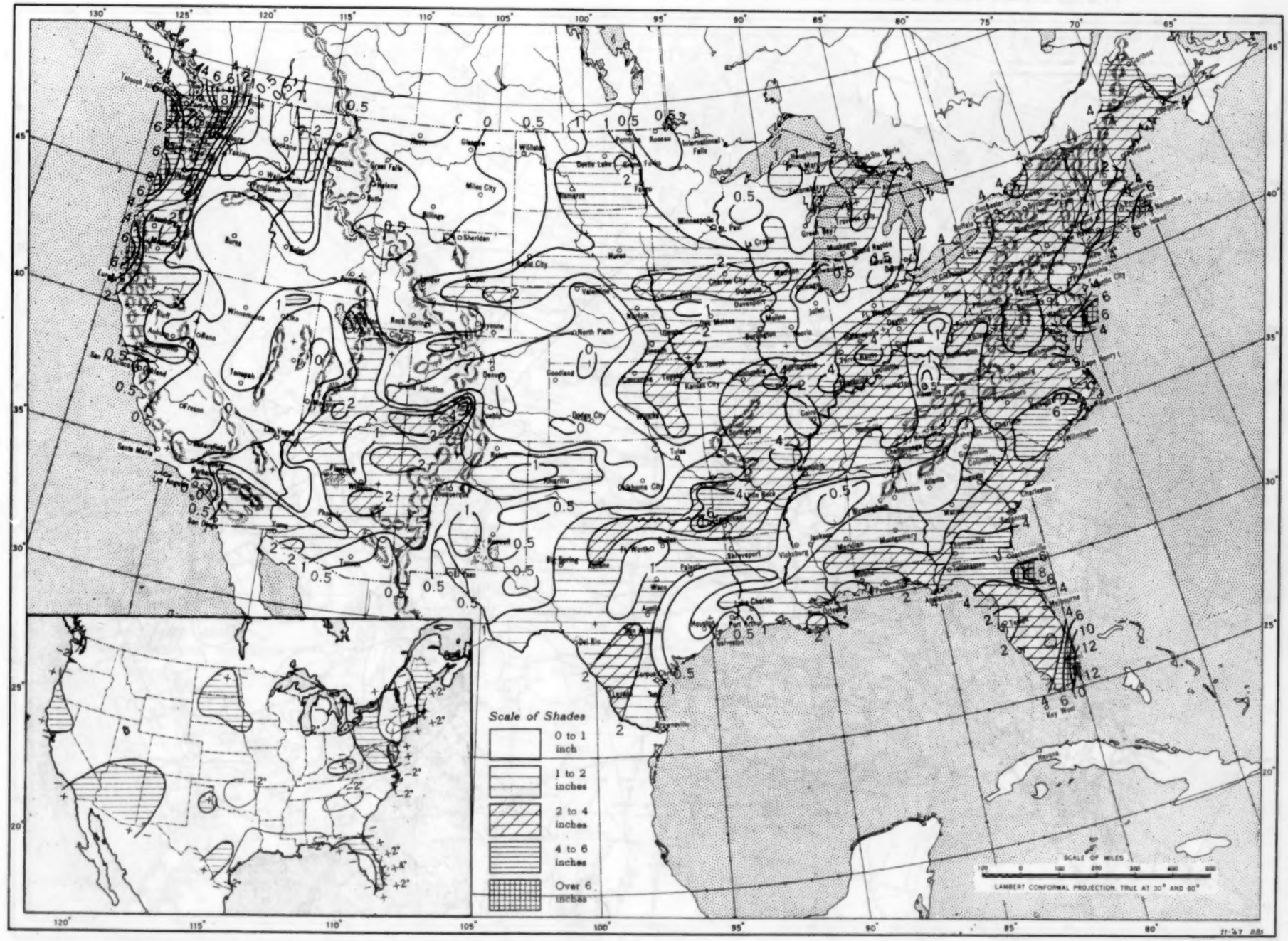

Scale of Shades
0 to 1 inch
1 to 2 inches
2 to 4 inches
4 to 6 inches
Over 6 inches
SCALE OF MILES
LAMBERT CONFORMAL PROJECTION TRUE AT 30° AND 60°

Chart VI. Isobars (mb.) at Sea Level and Isotherms (° F.) at Surface; Prevailing Winds, October 1948

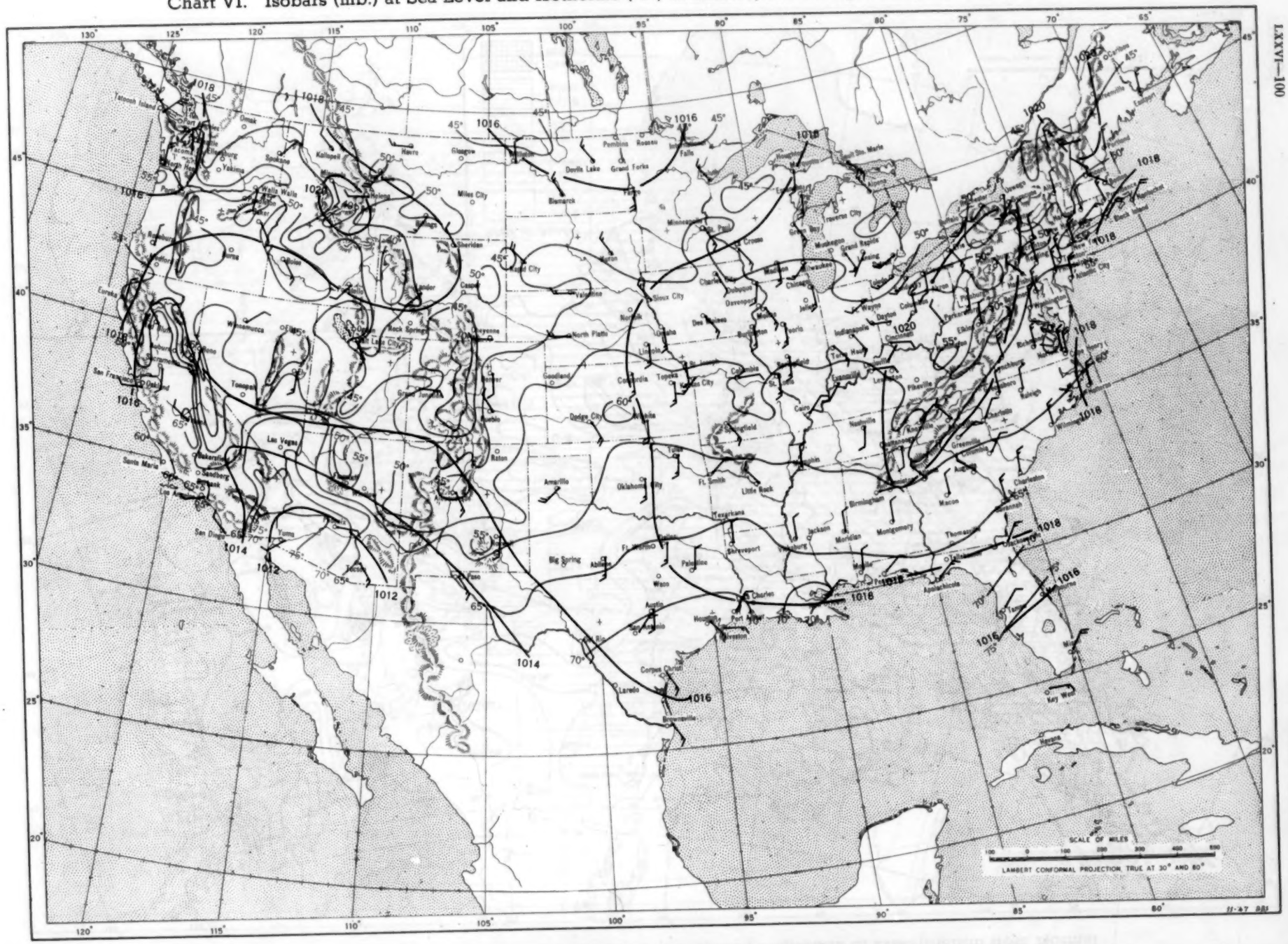
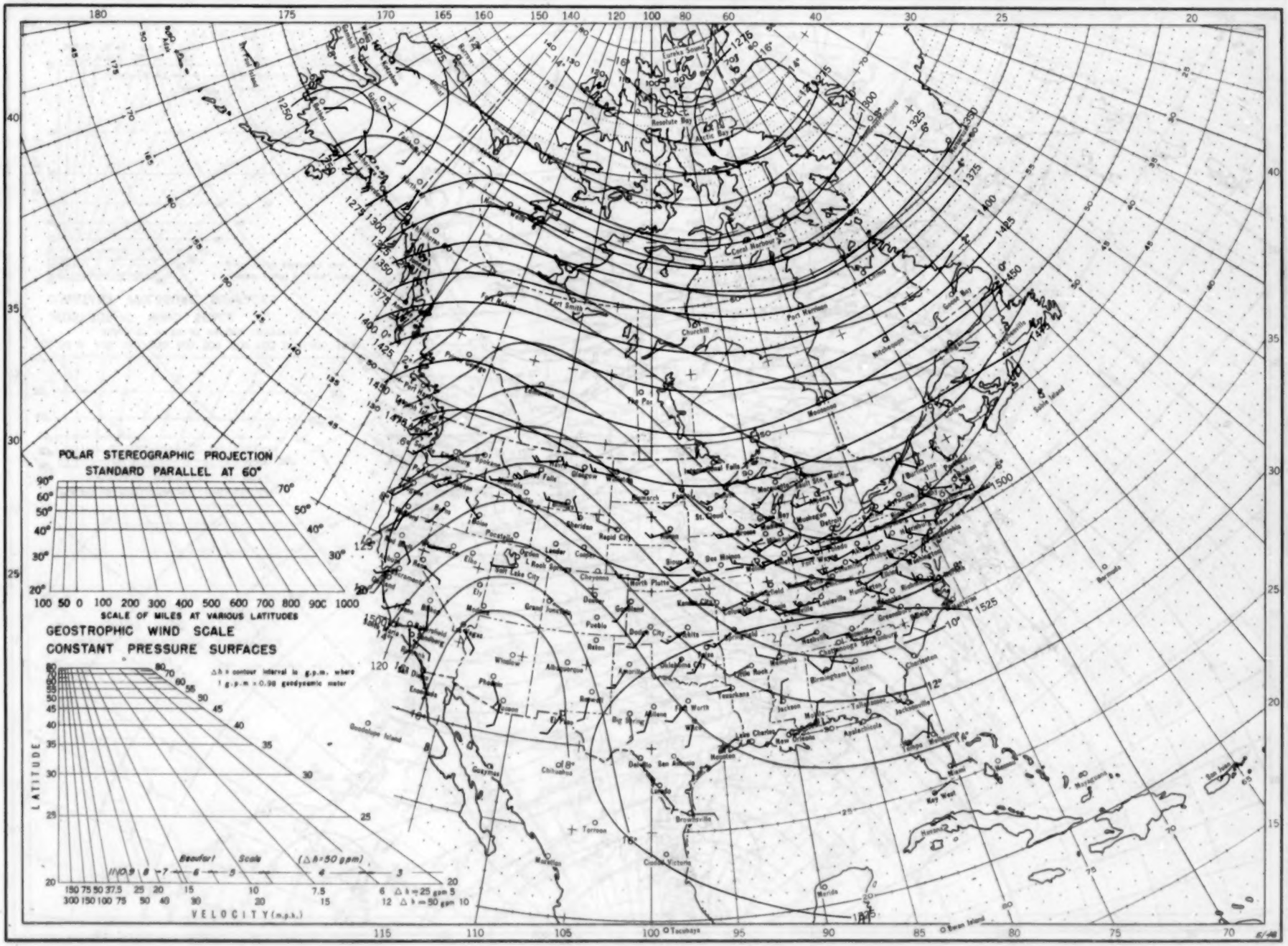


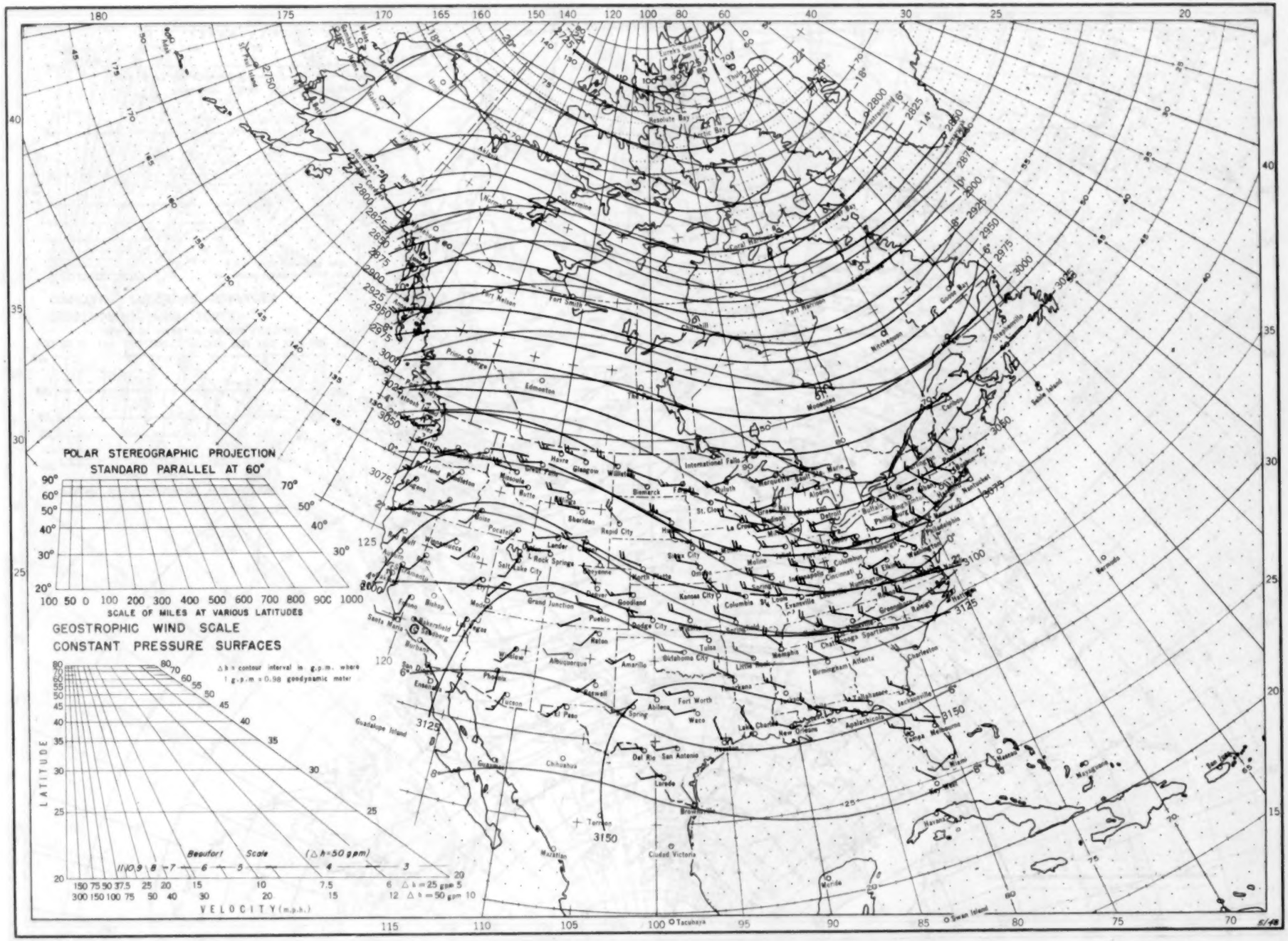
Chart VIII, October 1948. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 850-millibar Pressure Surface, and Resultant Winds at 1,500 Meters (

Chart VIII, October 1948. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 850-millibar Pressure Surface, and Resultant Winds at 1,500 Meters (m. s. l.)


POLAR STEREOGRAPHIC PROJECTION
STANDARD PARALLEL AT 60°
SCALE OF MILES AT VARIOUS LATITUDES
GEOSTROPHIC WIND SCALE
CONSTANT PRESSURE SURFACES
LATITUDE
VELOCITY (m.p.h.)
Beaufort Scale
Δh = contour interval in g.p.m. where 1 g.p.m. = 0.98 geodynamic meter

Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2200 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.

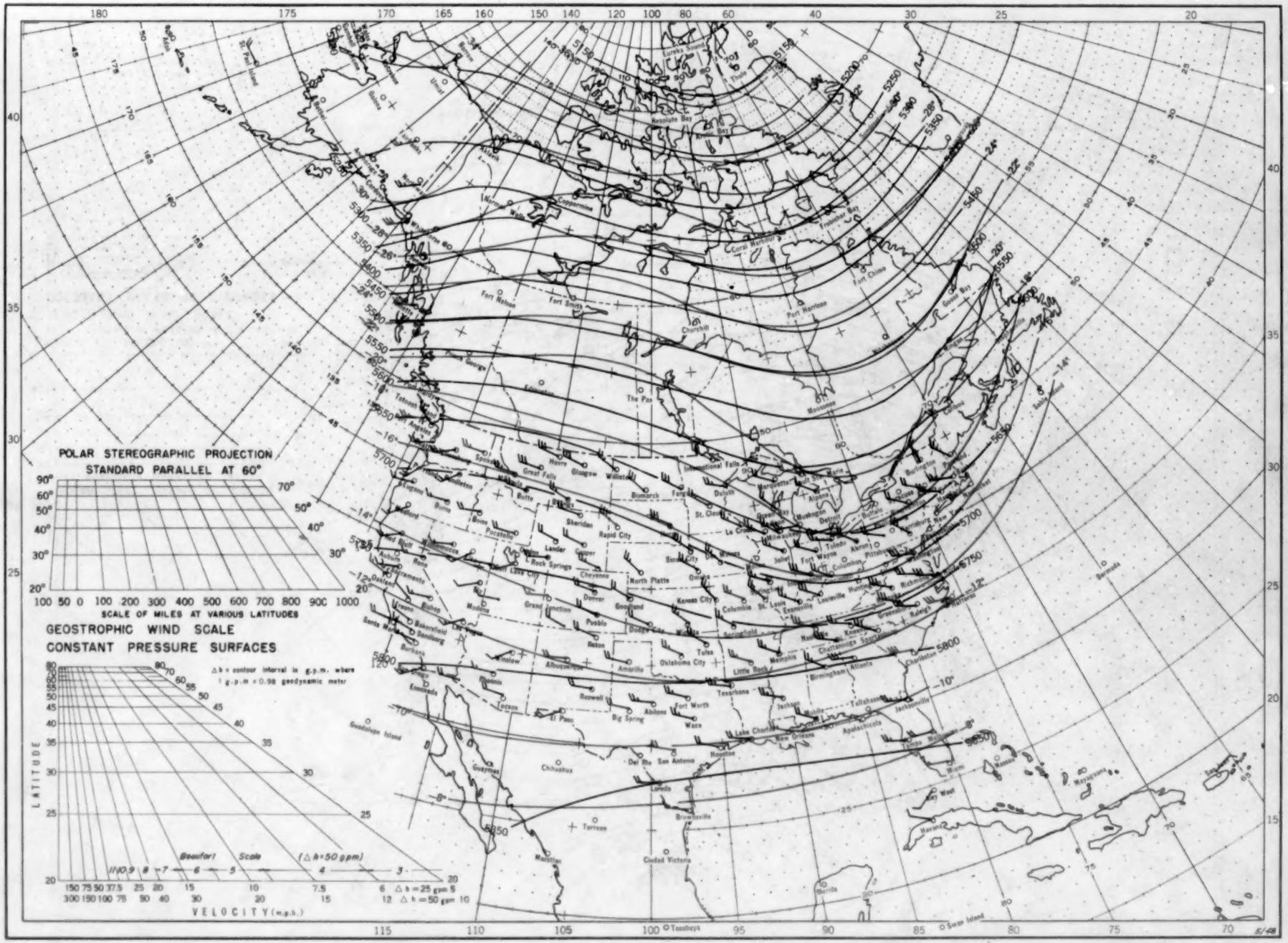
Chart IX, October 1948. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 700-millibar Pressure Surface, and Resultant Winds at 3,000 Meters (m. s. l.)



Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2200 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.

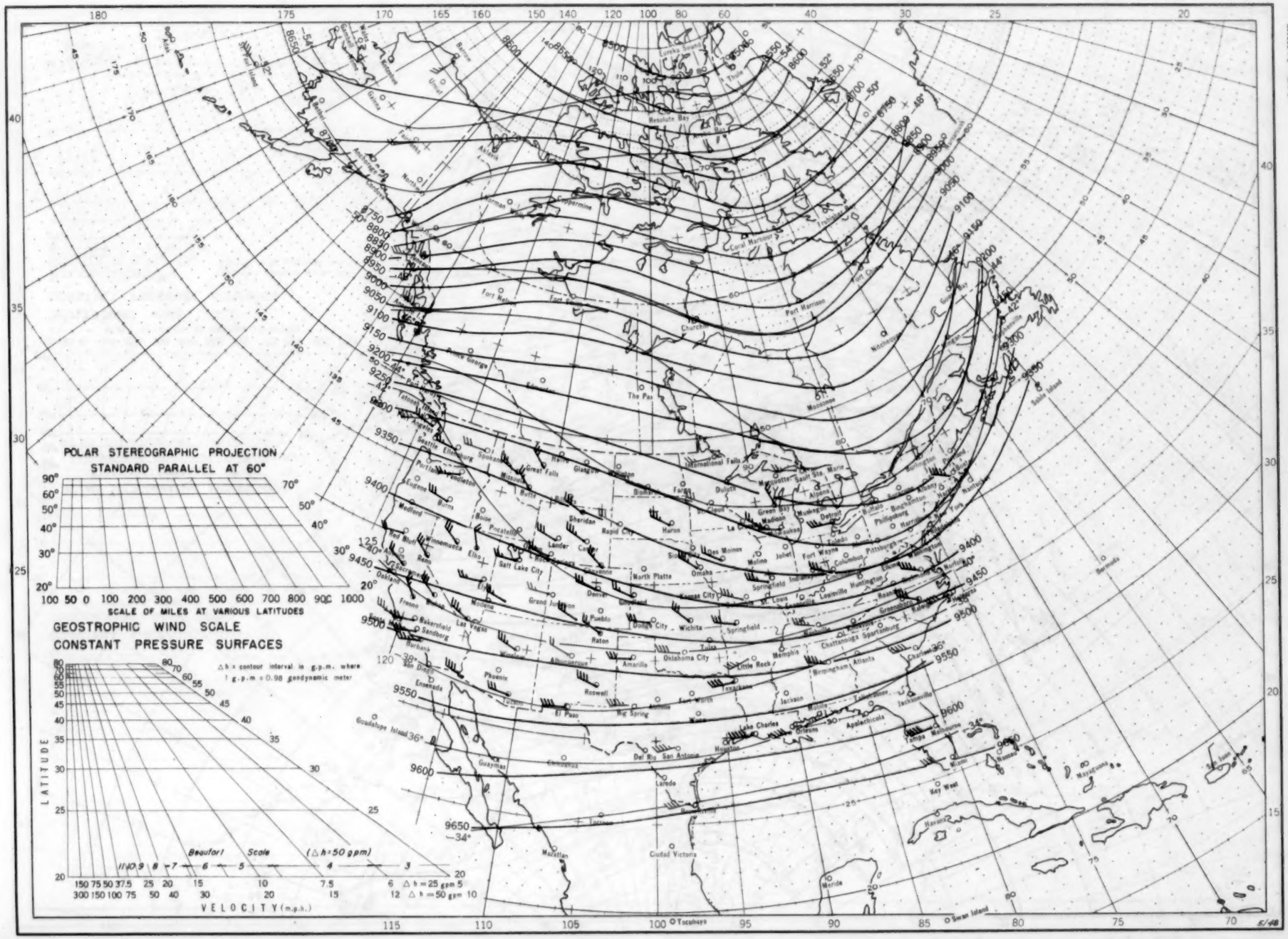
Chart X, October 1948. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 500-millibar Pressure Surface, and Resultant Winds at 5,000 Meters (m. s. l.)

Chart X, October 1948. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 500-millibar Pressure Surface, and Resultant Winds at 5,000 Meters (m. s. l.)


POLAR STEREOGRAPHIC PROJECTION
STANDARD PARALLEL AT 60°
SCALE OF MILES AT VARIOUS LATITUDES
GEOSTROPHIC WIND SCALE
CONSTANT PRESSURE SURFACES
LATITUDE
VELOCITY (m.p.h.)
Beaufort Scale
Δh = contour interval in g.p.m. where 1 g.p.m. = 0.98 geodynamic meter

Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2200 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.

Chart XI, October 1948. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 300-millibar Pressure Surface, and Resultant Winds at 10,000 Meters (m. s. l.)



Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2200 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.